LINSCOTT LAW & GREENSPAN engineers

TRAFFIC IMPACT ANALYSIS

SALVATION ARMY

SIERRA DEL MAR DIVISIONAL CAMP

Ramona, California
September 4, 2009
Revised December 22, 2009

Prepared for:
The County of San Diego
On behalf of:
BRG Consulting

LLG Ref. 3-99-0865

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EXECUTIVE SUMMARY

Linscott, Law & Greenspan Engineers (LLG) has been retained to assess the traffic impacts associated with the expansion of the existing Salvation Army Sierra Del Mar Divisional Camp.

The existing Sierra Del Mar Divisional Camp proposed expansion could occur in several phases, although this traffic impact analysis considers the worst-case, buildout of the project. Currently, the camp is used year-round, with a weekly summer camp during the summer months, and retreat center for the balance of the year.

The existing Salvation Army Divisional Camp and Retreat operates year-round, with operations divided into two seasons: 1) Camp (summer), which includes youth camping for eight weeks during mid-June to mid-August; and 2) Retreat, which includes Salvation Army group retreats and private rentals for the balance of the year. The current typical summer population is approximately 165 people (115 youth campers and 50 staff). The campers stay for one week, and arrive on Monday afternoons (between 2:00 and 4:00 p.m.) in passenger vans and buses and depart on Saturday morning (between 9:00 and 10:00 a.m.). Camp staff arrives on Monday mornings and departs on Saturday afternoons, with one-half remaining for the duration of the season. The typical retreat population is approximately 90 people, including five staff members. The retreat groups arrive on Friday evenings, with half arriving during the evening and the remaining half arriving later. These groups leave on Sundays midday. Nearly all traffic occurs off-peak and on weekends. Most retreat visitors arrive by van or carpool.

Manual traffic counts were conducted during the AM and PM peak hours at the SR 67/Mussey Grade Road and SR 67/Archie Moore Road intersections during August 2009, when local schools were not in session. To account for school traffic, LLG conducted a comparison between the August 2009 counts and historical data during times when schools were in session. A review of the findings concluded that the counts varied by approximately 1% (school vs. no school). However, to be conservative, LLG applied a 5% growth factor to critical movements at these two intersections to account for school related traffic. Traffic data for the intersection of SR 67 and Dye Road was obtained from a previous report completed by LLG. These volumes were collected while schools were in session in 2008.

The following scenarios were analyzed for the key intersection and street segments within the project limits:

- Existing
- Existing + project
- Existing + project + cumulative projects

Based on the results of the intersection and segment analyses, the project is calculated to result in significant cumulative impacts at the three intersections, and the two-lane highway segment SR 67 between Archie Moore Road and Mussey Grade Road To mitigate these impacts, the project shall make an appropriate payment to the County's established Traffic Impact Fee (TIF) program.

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1.0 INTRODUCTION

1.1 Purpose of the Report

The following traffic study has been prepared to determine and evaluate the traffic impacts on the local circulation system due to the expansion of the existing Salvation Army Sierra Del Mar Divisional Camp, located in the community of Ramona in the County of San Diego. ***Figure 1*** shows the vicinity map, ***Figure 2*** shows a more detailed project area map, and ***Figure 3*** shows the conceptual site plan for the project.

Included in this traffic analysis are:

- Project Description;
- Existing conditions assessment;
- Project traffic generation/distribution/assignment;
- Intersection and street segment capacity analysis;
- Project Access, On-site circulation, and parking;
- Special event traffic;
- Conclusions/Recommendations.

1.2 Project Location and Description

The site is located on the west side of Mussey Grade Road approximately 1.5 miles south of State Route (SR) 67. Direct access to the site is via the existing unimproved road from Mussey Grade Road to the main facility. Construction of the expansion may occur in several phases. However, to provide a worst-case analysis, this Traffic Impact Analysis assumes the effects of full buildout. Currently, the camp is used year-round, with a weekly summer camp during the summer months, and retreat center for the balance of the year.

1.2.1 *Existing Summer (On-Season)*

The current typical summer camp population is approximately 115 youth campers and 50 staff. The campers arrive on Monday afternoons between 2:00 and 4:00 PM in passenger vans holding 15 campers each. The campers then leave on Saturday mornings between 9:00 and 10:00 AM. Staff arrives on Mondays and departs on Saturdays, at different times than the campers. One-half of the

staff remains on-site for the duration of the summer. These characteristics are expected to continue into the future.

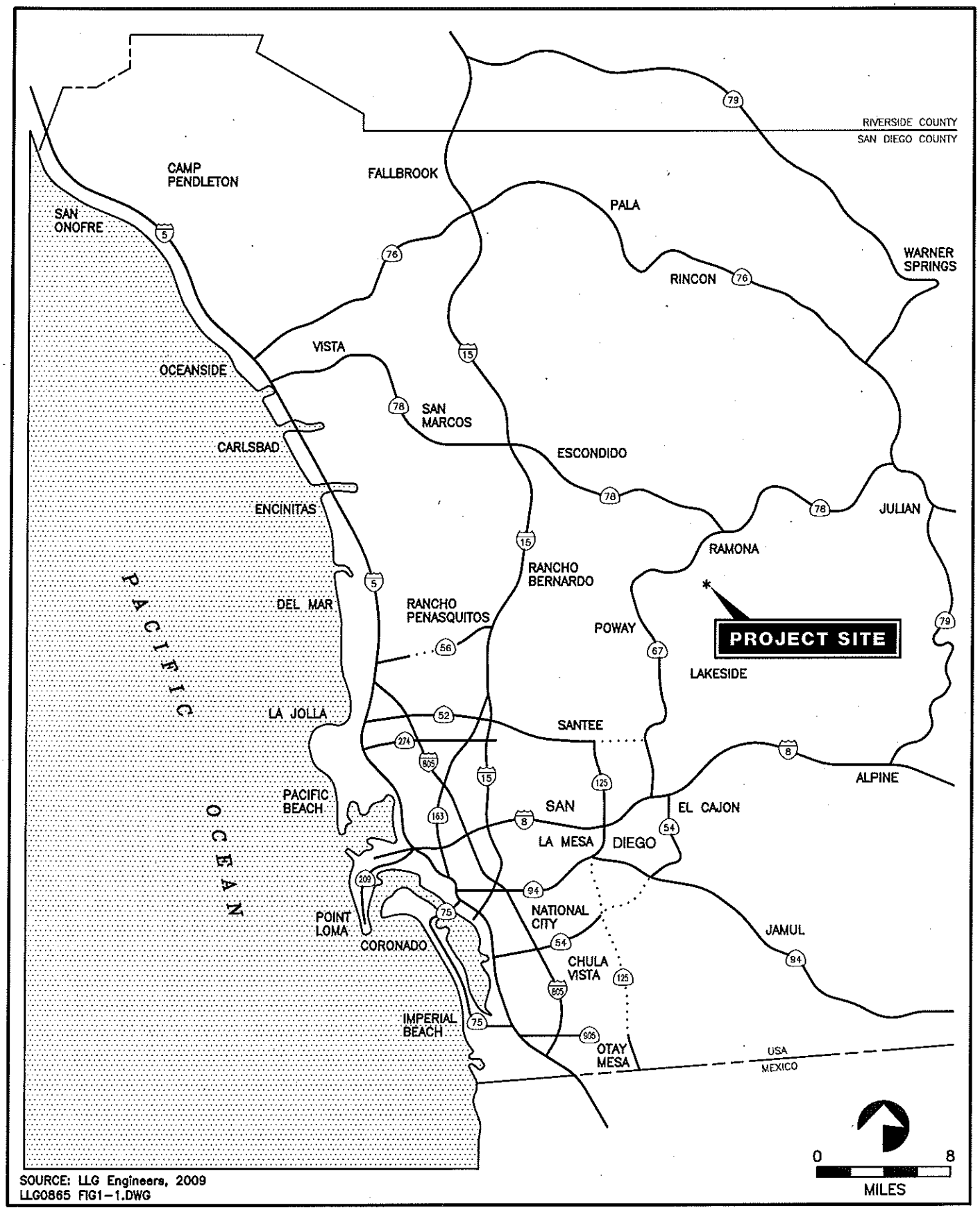
1.2.2 *Existing Retreat (Off-Season)*

The current typical retreat population of the camp is approximately 90 people, including 5 staff members. Retreat groups arrive on Friday evenings, with a maximum of one-half arriving during the PM peak period (between 4 and 6 PM), and one-half arriving later. The groups leave on Sundays around midday.

1.2.3 *Proposed Project*

For the purpose of this analysis, a maximum future retreat capacity of 175 persons was assumed for buildout of the project. The maximum capacity of 175 people is based on the total occupancy of the proposed structures and the number of reservations allowed at the retreat center.

The average future summer camp population would be 573 guests (523 campers/50 staff), but the site could have 748 guests total when the retreat facility is rented or used for Salvation Army functions concurrently with the summer camp. These guest/staff estimates are based on the total occupancy of the proposed structures, and represent maximum occupancy. It should be noted that as of November 2009, the applicant is proposing a lower population (615 people) than analyzed in this report. Thus, the findings of this report are considered worst-case, and conservative.



SOURCE: LLG Engineers, 2009
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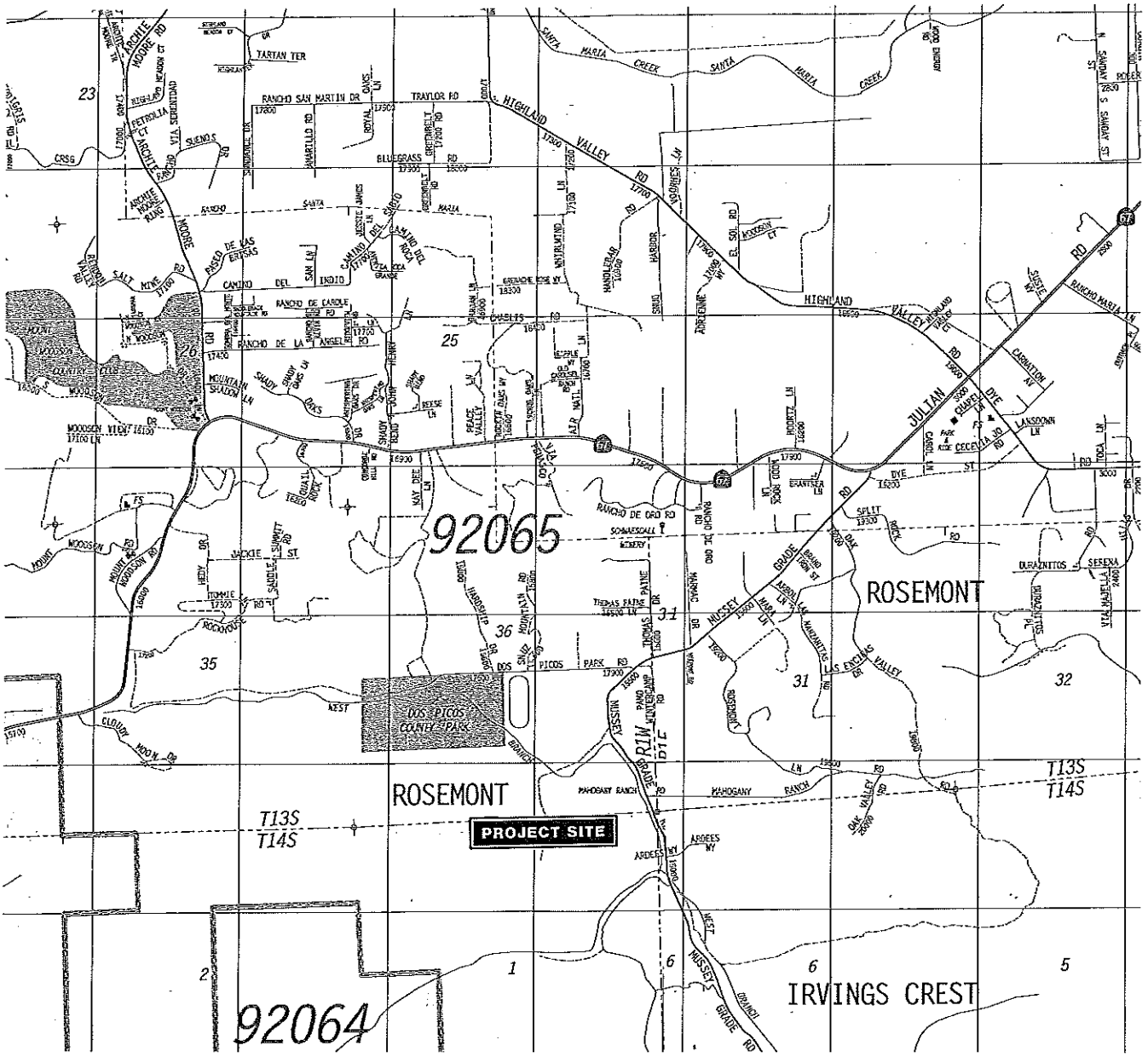
Figure 1

VICINITY MAP

SIERRA DEL MAR



Source: Thomas Guide, 2004
LLG0865 FIG2.DWG

NO SCALE

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Figure 2

PROJECT AREA MAP

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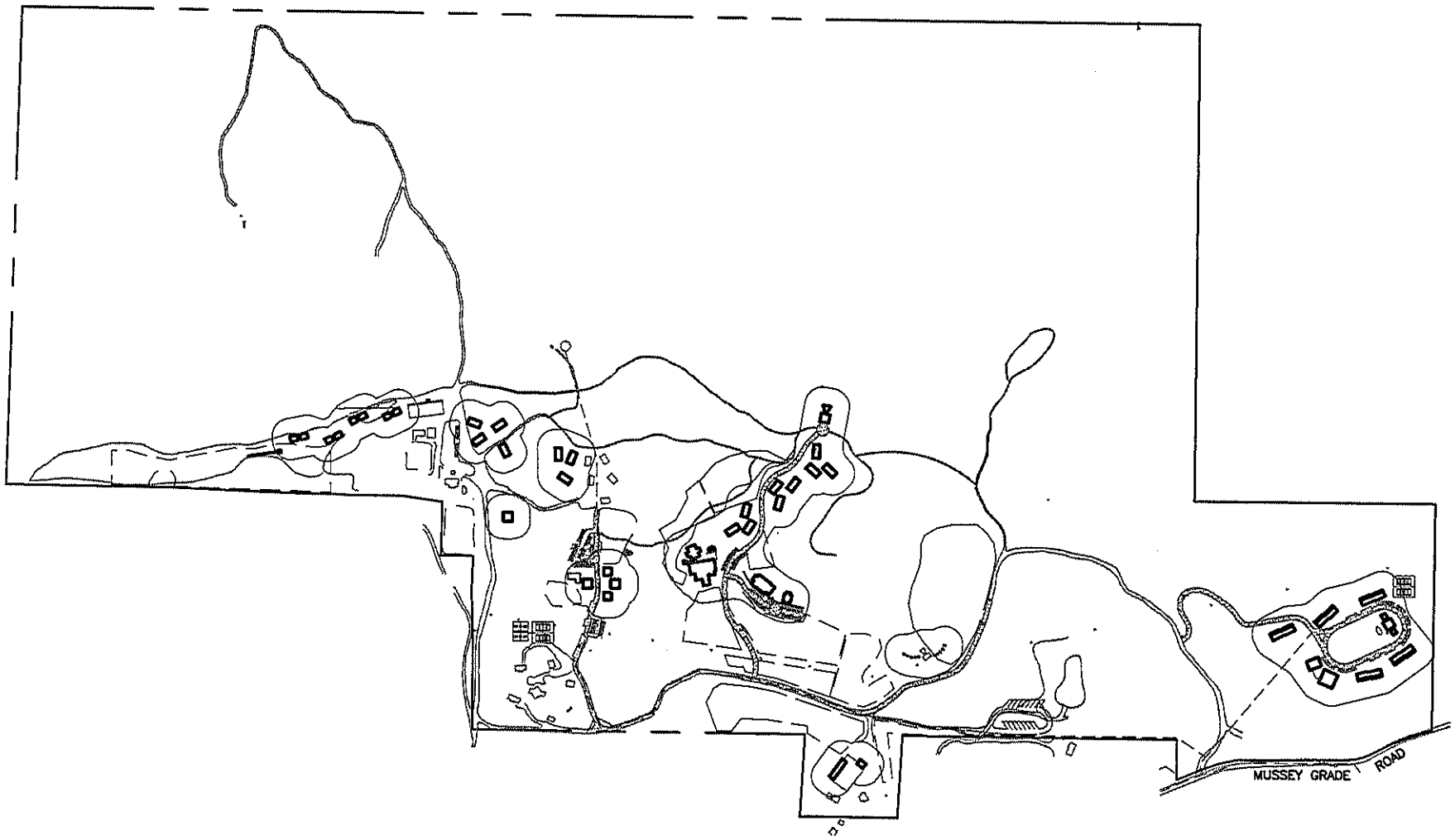

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NO SCALE

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Figure 3

SITE PLAN

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2.0 EXISTING CONDITIONS

The intersections and segments included in the study area are listed below. These locations were chosen based on the County's published criteria of 25 bi-directional peak hour trips. ***Figure 4*** depicts the existing geometric conditions for the study area intersections and segments.

Intersections

- SR 67 / Dye Road
- SR 67 / Mussey Grade Road
- SR 67 / Archie Moore Road

Street Segments

Mussey Grade Road

- SR 67 to Dos Picos Park Road
- South of Dos Picos Park Road

Two-Lane Highway Segment

SR 67

- Archie Moore Road to Mussey Grade Road

2.1 Existing Roadway Conditions

The following is a description of the nearby roadway network:

Main Street (SR 67) is classified as a Collector Road between Archie Moore Road and Dye Road on the existing County of San Diego Circulation Element, and on the County's GP Upate Circulation Element. Main Street/ SR 67 is currently constructed as a two-lane undivided roadway with bike lanes provided in both directions, and curbside parking is prohibited. The posted speed limit within the project area ranges between 50 and 55 mph. SR 67 is considered as a two-lane highway in the study area.

Dye Road is currently a two-lane road and is classified as a Major Road on the current County of San Diego Circulation Element, and as a Community Collector on the GP Update Circulation Element. Dye Road is currently a two-lane undivided roadway with a posted speed limit of 50 mph. Curbside parking is prohibited. No bus stops are provided.

Mussey Grade Road is a two-lane undivided road in the project area. Mussey Grade Road is not classified on the County of San Diego Circulation Element; however, it is classified on the County's Bicycle Element to have a bike lane. Mussey Grade Road generally has 12-foot lanes with 4.5-foot paved shoulders. The posted speed limit is 50 mph near SR 67, and curbside parking is generally not available. The shoulder width decreases further south on Mussey Grade Road. Mussey Grade Road dead-ends at the San Vicente Reservoir.

Measurements of the width of Mussey Grade Road were conducted at several locations from north to south as follows:

- At Brand Iron Street—32 feet
- At Mara Lane—32 feet
- At Dos Picos Road—36 feet
- North of Mahogany Ranch Road—31 feet
- South of Mahogany Ranch Road—26 feet
- North of Salvation Army Entrance—28 feet

The narrowest observed section of Mussey Grade Road is approximately 0.25 miles south of Mahogany Ranch Road and is approximately 26 feet in width with 1–3 foot shoulders. This segment is approximately 50 feet in length.

Except for a relatively short section, the existing Mussey Grade Road meets the County's Public Road Interim Standards of 28 feet of width. The 26-foot wide section discussed above is constrained by a creek on the west side and an embankment on the east side. Existing traffic volume on this segment is low at 1,120 ADT. This is discussed in further detail in *Section 5.1* (Project Access).

Archie Moore Road is currently a two-lane road and is classified as a Rural Collector on the current County of San Diego Circulation Element and as a Community Collector on the GP Update Circulation Element. Archie Moore Road is currently a two-lane undivided roadway with a posted speed limit of 50 mph. Curbside parking is prohibited. No bus stops are provided.

2.2 Existing Traffic Volumes

2.2.1 *Peak Hour Intersection Turning Movement Volumes*

Manual traffic counts were conducted during the AM and PM peak hours at the SR 67/Mussey Grade Road and SR 67/Archie Moore Road intersections during August 2009, when local schools were not in session. To account for school traffic, LLG conducted a comparison between the August 2009 counts and historical data during times when schools were in session. A review of the findings concluded that the counts varied by approximately 1% (school vs. no school). However, to be conservative, LLG applied a 5% growth factor to critical movements at these two intersections to account for school related traffic. Traffic data for the intersection of SR 67 and Dye Road was obtained from a previous report completed by LLG. These volumes were collected while schools were in session in 2008.

Figure 5 shows the existing traffic volumes on a peak hour and daily basis.

2.2.2 *Daily Segment Volumes*

Table 2–1 is a summary of the most recent available daily traffic counts (ADT's) from County of San Diego and Caltrans count records. In addition, LLG commissioned 24-hour ADT counts along Mussey Grade Road.

Appendix A contains copies of the intersection manual count sheets and road tube count summaries.

TABLE 2–1
AVERAGE DAILY TRAFFIC VOLUMES

Street Segment	ADT[a]	Year	Source
SR 67			
Archie Moore Road to Mussey Grade Road	24,500	2008	Caltrans
Mussey Grade Road			
SR 67 to Dos Picos Park Road	3,030	2009	LLG[b]
South of Dos Picos Park Road	1,120	2009	LLG[b]

Footnotes:

a. Average Daily Traffic Volumes.

b. LLG commissioned counts. A 5% growth factor was applied to account for school-related traffic.

2.3 Existing Operations

The following analyses of existing traffic operations were conducted using methodology described in Section 4.1.

2.3.1 *Peak Hour Intersection Levels of Service*

Intersection capacity analyses were conducted at the study area intersections with existing traffic volumes and existing intersection lane configurations. ***Table 2–2*** shows the results of the existing intersection analysis.

A review of *Table 2–2* shows that the *signalized intersection* of SR 67/Dye Road is currently operating at LOS E during the AM peak hour, and acceptable LOS D during the PM peak hour.

Table 2–2 also shows that the minor street movements at the two *unsignalized intersections* are currently operating at LOS F for both the AM and PM peak hours with the exception of the SR 67 / Archie Moore Road intersection, which is calculated to operate at acceptable LOS C during the PM peak hour.

Appendix B contains the existing intersection analysis worksheets.

2.3.2 *Daily Street Segment Levels of Service*

Table 2–3 summarizes the existing roadway segment operations. As seen in *Table 2–3,* the segments along Mussey Grade Road are calculated to currently operate at acceptable LOS B or better.

2.3.3 *Two-Lane Highway Analysis*

Table 2–4 shows a summary of the existing two-lane highway operations on SR 67 between Archie Moore Road and Mussey Grade Road. This table shows that this segment is currently operating at LOS F with 24,500 existing ADT. This determination is based on the County's LOS F threshold of 22,900 ADT for a two-lane highway segment with signalized intersection spacing greater than 1 mile. The SR 67 segment east of Mussey Grade Road is not analyzed because the project's trip contribution is 10 peak hour directional trips or less (approximately 60 ADT), which could not constitute an impact based on the County's criteria, and does not warrant analysis.

TABLE 2–2
EXISTING INTERSECTION OPERATIONS

Intersection	Control Type	Peak Hour	Existing	
			Delay[a]	LOS[b]
1. SR 67 / Archie Moore Road	TWSC [c]	AM	>50.1	F
		PM	19.5	C
2. SR 67 / Mussey Grade Road	TWSC	AM	>50.1	F
		PM	>50.1	F
3. SR 67 / Dye Road	Signal	AM	71.0	E
		PM	38.0	D

Footnotes:
a. Average delay expressed in seconds per vehicle.
b. Level of Service.
c. TWSC – Two-Way Stop Controlled intersection. Minor street left turn delay is reported.

SIGNALIZED		UNSIGNALIZED	
DELAY/LOS THRESHOLDS		DELAY/LOS THRESHOLDS	
Delay	LOS	Delay	LOS
0.0 < 10.0	A	0.0 < 10.0	A
10.1 to 20.0	B	10.1 to 15.0	B
20.1 to 35.0	C	15.1 to 25.0	C
35.1 to 55.0	D	25.1 to 35.0	D
55.1 to 80.0	E	35.1 to 50.0	E
> 80.1	F	> 50.1	F

TABLE 2–3
EXISTING STREET SEGMENT OPERATIONS

Street Segment	Classification	Capacity (LOS E) [a]	ADT [b]	LOS [c]
Mussey Grade Road				
SR 67 to Dos Picos Park Road	Unclassified	16,200	3,030	B
South of Dos Picos Park Road	Unclassified	16,200	1,120	A

Footnotes:

a. Capacities based on County of San Diego Roadway Classification Table.
b. Average Daily Traffic Volumes.
c. Level of Service

TABLE 2–4
COUNTY OF SAN DIEGO – TWO-LANE HIGHWAY ANALYSIS

Two-Lane Highway Segment – SR 67	Existing	
	Volume	LOS [a]
Archie Moore Road to Mussey Grade Road	24,500	F

Footnotes:

a. Level of Service. County threshold for LOS F for two lane highway segment with signalized intersection spacing > 1 mile = 22,900 ADT.

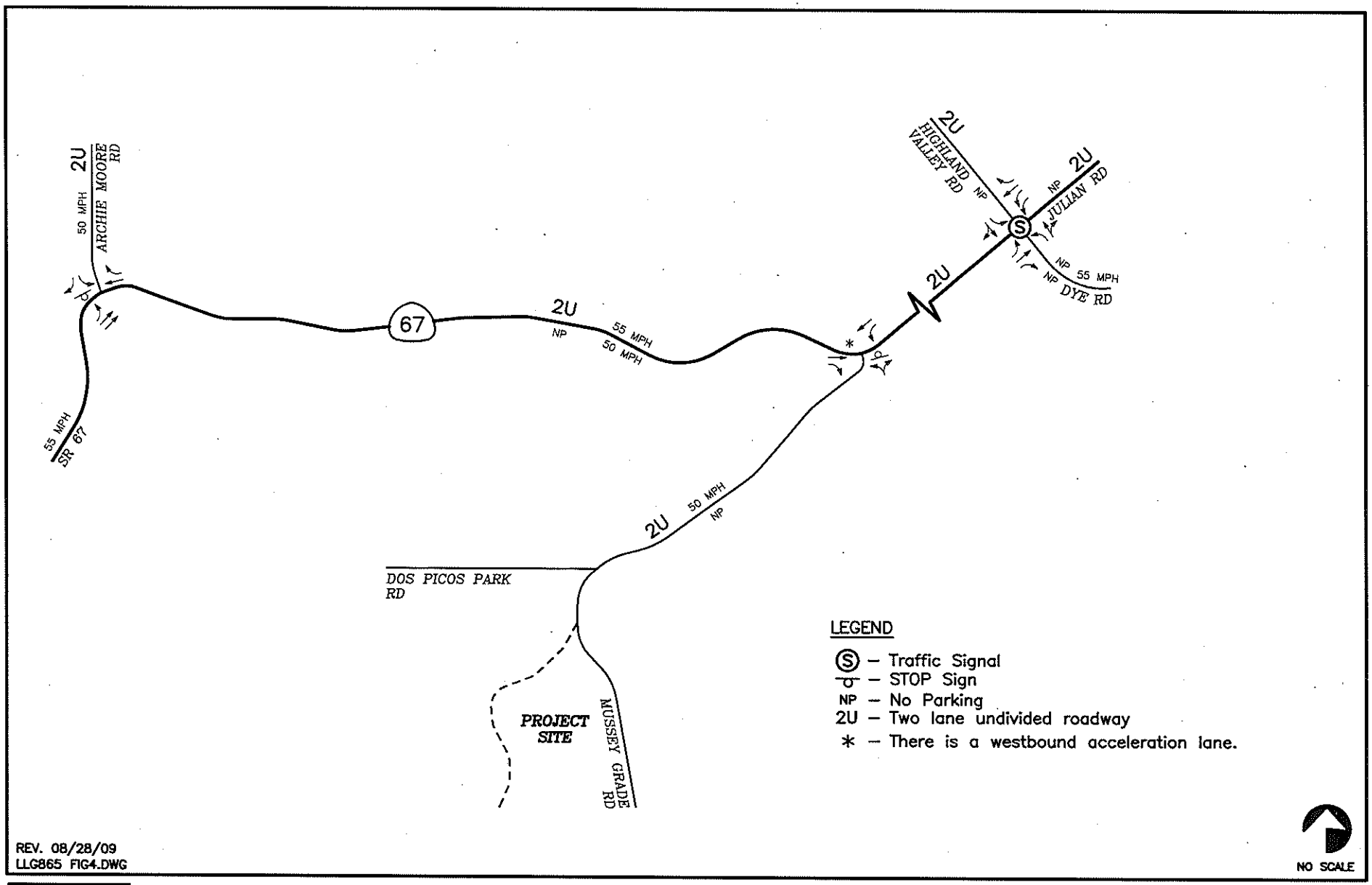

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Figure 4

EXISTING CONDITIONS DIAGRAM

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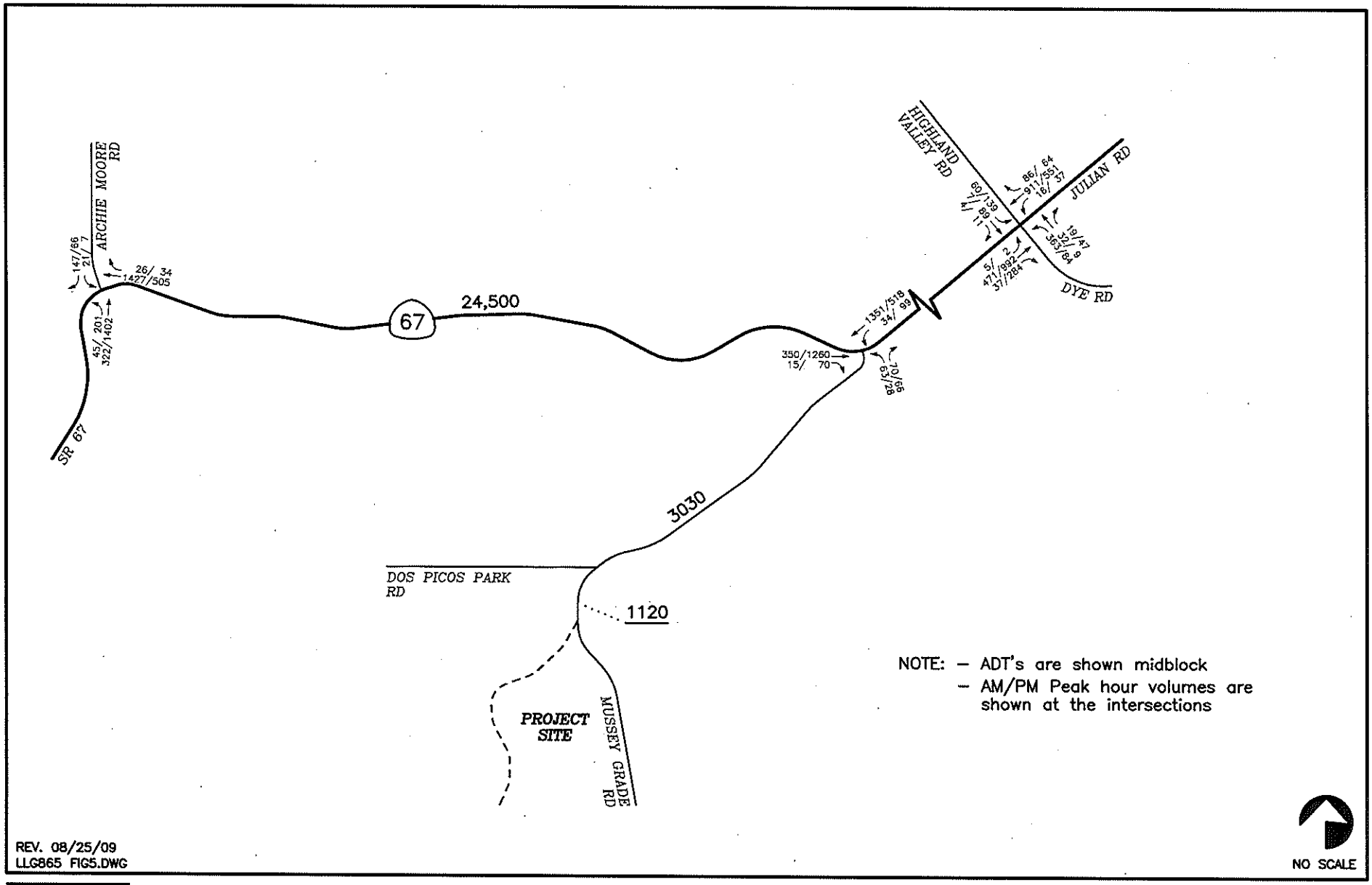

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Figure 5

EXISTING TRAFFIC VOLUMES AM/PM PEAK HOURS & ADTs

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3.0 SIGNIFICANCE CRITERIA

The following criterion was utilized to evaluate potential significant impacts, based on the County's documents "Guidelines for Determining Significance", effective June 30, 2009.

3.1.1 *Road Segments*

Pursuant to the County's General Plan Public Facilities Element (PFE), new development must provide improvements or other measures to mitigate traffic impacts to avoid:

a. Reduction in Level of Service (LOS) below "C" for on-site Circulation Element roads;

b. Reduction in LOS below "D" for off-site and on-site abutting Circulation Element roads; and

c. "Significantly impacting congestion" on roads that operate at LOS "E" or "F". If impacts cannot be mitigated, the project will be denied unless a statement of overriding findings is made pursuant to the State CEQA Guidelines. The PFE, however, does not include specific guidelines/thresholds for determining the amount of additional traffic that would "significantly impact congestion" on such roads, as that phrase is used in item (c) above.

The County has created the following guidelines to evaluate likely traffic impacts of a proposed project for road segments and intersections serving that project site, for purposes of determining whether the development would "significantly impact congestion" on the referenced LOS E and F roads. The guidelines are summarized in ***Table 3–1***. The thresholds in *Table 3–1* are based upon average operating conditions on County roadways. It should be noted that these thresholds only establish general guidelines, and that the specific project location must be taken into account in conducting an analysis of traffic impact from new development.

TABLE 3–1
MEASURES OF SIGNIFICANT PROJECT IMPACTS TO CONGESTION ON ROAD SEGMENTS
ALLOWABLE INCREASES ON CONGESTED ROAD SEGMENTS

Level of Service	Two-Lane Road	Four-Lane Road	Six-Lane Road
LOS E	200 ADT	400 ADT	600 ADT
LOS F	100 ADT	200 ADT	300 ADT

General Notes:

1. By adding proposed project trips to all other trips from a list of projects, this same table must be used to determine if total cumulative impacts are significant. If cumulative impacts are found to be significant, each project that contributes any trips must mitigate a share of the cumulative impacts.
2. The County may also determine impacts have occurred on roads even when a project's traffic or cumulative impacts do not trigger an unacceptable level of service, when such traffic uses a significant amount of remaining road capacity.

On-site Circulation Element Roads—PFE, Transportation, Policy 1.1 states that "new development shall provide needed roadway expansion and improvements on-site to meet demand created by the development, and to maintain a Level of Service C on Circulation Element Roads during peak traffic hours". Pursuant to this policy, a significant traffic impact would result if:

- The additional or redistributed ADT generated by the proposed land development project will cause on-site Circulation Element Roads to operate below LOS C during peak traffic.

Off-Site Circulation Element Roads—PFE, Transportation, Policy 1.1 also states that "new development shall provide needed roadway expansion and improvements off-site to meet demand created by the development, and to maintain a Level of Service D on Circulation Element Roads." "New development that would significantly impact congestion on roads operating at LOS E or F, either currently or as a result of the project, will be denied unless improvements are scheduled to improve the LOS to D or better or appropriate mitigation is provided." The PFE, however, does not specify what would significantly impact congestion or establish criteria for evaluating when increased traffic volumes would significantly impact congestion. The following significance guidelines provided are the County's preferred method for evaluating whether or not increased traffic volumes generated or redistributed from a proposed project will "significantly impact congestion" on County roads, operating at LOS E or F, either currently or as a result of the project.

Traffic volume increases from projects that result in one or more of the following criteria will have a significant traffic impact on a road segment, unless specific facts show that there are other circumstances that mitigate or avoid such impacts:

- The additional or redistributed ADT generated by the proposed project will significantly increase congestion on a Circulation Element Road or State Highway currently operating at LOS E or LOS F, or will cause a Circulation Element Road or State Highway to operate at a LOS E or LOS F as a result of the proposed project as identified in *Table 3–1*, or

- The additional or redistributed ADT generated by the proposed project will cause a residential street to exceed its design capacity.

3.1.2 *Intersections*

This section provides guidance for evaluating adverse environmental effects a project may have on signalized and unsignalized intersections.

Signalized Intersections—Traffic volume increases from public or private projects that result in one or more of the following criteria will have a significant traffic volume or level of service traffic impact on a signalized intersection:

- The additional or redistributed ADT generated by the proposed project will significantly increase congestion on a signalized intersection currently operating at LOS E or LOS F, or will cause a signalized intersection to operate at a LOS E or LOS F as identified in ***Table 3–2***.

Unsignalized Intersections—the operating parameters and conditions for unsignalized intersections differ dramatically from those of signalized intersections. Very small volume increases on one leg or turn and/or through movement of an unsignalized intersection can substantially affect the calculated delay for the entire intersection. Significance criteria for unsignalized intersections are based upon a minimum number of trips added to a critical movement at an unsignalized intersection.

Traffic volume increases from public or private projects that result in one or more of the following criteria will have a significant traffic volume or level of service traffic impact on an unsignalized intersection:

- The additional or redistributed ADT generated by the proposed project will add 20 or more peak hour trips to a critical movement of an unsignalized intersection, and cause an unsignalized intersection to operate below LOS D, or
- The additional or redistributed ADT generated by the proposed project will add 20 or more peak hour trips to a critical movement of an unsignalized intersection currently operating at LOS E, or
- The additional or redistributed ADT generated by the proposed project will add 5 or more peak hour trips to a critical movement of an unsignalized intersection, and cause the unsignalized intersection to operate at LOS F, or
- The additional or redistributed ADT generated by the proposed project will add 5 or more peak hour trips to a critical movement of an unsignalized intersection currently operating at LOS F, or
- Based upon an evaluation of existing accident rates, the signal priority list, intersection geometrics, proximity of adjacent driveways, sight distance or other factors, it is found that the generation rate is less than those specified above, and would significantly impact the operations of the intersection.

TABLE 3–2
MEASURES OF SIGNIFICANT PROJECT IMPACTS TO CONGESTION ON INTERSECTIONS
ALLOWABLE INCREASES ON CONGESTED INTERSECTIONS

Level of service	Signalized	Unsignalized
LOS E	Delay of 2 seconds	20 peak hour trips on a critical movement
LOS F	Delay of 1 second, or 5 peak hour trips on a critical movement	5 peak hour trips on a critical movement

General Notes:

1. A critical movement is one that is experiencing excessive queues.
2. By adding proposed project trips to all other trips from a list of projects, these same tables are used to determine if total cumulative impacts are significant. If cumulative impacts are found to be significant, each project that contributes any trips must mitigate a share of the cumulative impacts.
3. The County may also determine impacts have occurred on roads even when a project's traffic or cumulative impacts do not trigger an unacceptable level of service, when such traffic uses a significant amount of remaining road capacity.

3.2 Two-Lane Highway Segments

In addition, ***Table 3–3*** from the adopted "Guidelines for Determining Significance" was used to determine significance on the portion of SR 67 between Archie Moore Road and Mussey Grade Road.

TABLE 3–3
MEASURES OF SIGNIFICANT PROJECT IMPACTS TO CONGESTION
ALLOWABLE INCREASES ON TWO-LANE HIGHWAYS
(With Signalized Intersection Spacing Over One Mile)

Level of Service	LOS Criteria	Impact Significance Level
LOS E	> 16,200 ADT	>325 ADT
LOS F	> 22,900 ADT	>225 ADT

General Notes:

1. Where detailed data is available, the Director of Public Works may also accept a detailed level of service analysis based upon the two-lane highway analysis procedures provided in the Chapter 20 Highway Capacity Manual.

3.3 Congestion Management Program Requirements

The Congestion Management Program (CMP), adopted on November 22, 1991 and most recently updated in 2008, is intended to link land use, transportation and air quality through level of service performance. The CMP requires an Enhanced CEQA Review for projects that are expected to generate more than 2,400 ADT or more than 200 peak hour trips. As the project trip generation summarizes in *Section 4.2*, the project does not exceed the CMP thresholds on either a daily or peak hour basis. Therefore a CMP analysis is not required.

4.0 PROJECT IMPACT ANALYSIS

4.1 Analysis Methodology

Level of service (LOS) is the term used to denote the different operating conditions which occur on a given roadway segment under various traffic volume loads. It is a qualitative measure used to describe a quantitative analysis taking into account factors such as roadway geometries, signal phasing, speed, travel delay, freedom to maneuver, and safety. Level of service provides an index to the operational qualities of a roadway segment or an intersection. Level of service designations range from A to F, with LOS A representing the best operating conditions and LOS F representing the worst operating conditions. Level of service designation is reported differently for signalized intersections, unsignalized intersections and roadway segments.

4.1.1 *Intersections*

Signalized intersections were analyzed under AM and PM peak hour conditions. Average vehicle delay was determined utilizing the methodology found in Chapter 16 of the *2000 Highway Capacity Manual (HCM),* with the assistance of the *Synchro* (version 7.0) computer software. The delay values (represented in seconds) were qualified with a corresponding intersection Level of Service (LOS). Signalized intersection calculation worksheets and a more detailed explanation of the methodology are attached in ***Appendix B***.

Unsignalized intersections were analyzed under AM and PM peak hour conditions. Average vehicle delay and Levels of Service (LOS) was determined based upon the procedures found in Chapter 17 of the *2000 Highway Capacity Manual (HCM),* with the assistance of the *Synchro* (version 7.0) computer software. Unsignalized intersection calculation worksheets and a more detailed explanation of the methodology are attached in *Appendix B.*

4.1.2 *Street Segments*

Street segment analysis is based upon the comparison of daily traffic volumes (ADTs) to the County of San Diego's *Roadway Classification, Level of Service, and ADT Table*. This table provides segment capacities for different street classifications, based on traffic volumes and roadway characteristics. The County of San Diego's *Roadway Classification, Level of Service, and ADT Table* is attached in ***Appendix C***. Mussey Grade Road is a Non-Circulation Element (CE) public road. Two-lane CE road capacity criteria has been used for the purpose of roadway segment LOS assessment, but Mussey Grade Road functions similar to a Non-CE Residential Collector which can accommodate local traffic volumes up to 4,500 ADT with stable flow. As stated in the Public Road Standards, Levels of Service are not applied to residential streets since their primary purpose is to serve abutting lots, not carry through traffic.

4.1.3 *Two-Lane Highway Analysis*

The County of San Diego has published guidelines for the analysis of designated County Circulation Element Roads that are State Highways that are managed and maintained by Caltrans. These highways include SR 67, which operates as a two-lane highway. LOS criteria is provided for segments with signalized intersection spacing greater than one-mile, and signalized intersection

spacing less than one mile. Where signalized intersection spacing is greater than one-mile, LOS is determined using an ADT look-up table, similar to street segments listed above. Where signalized intersection spacing is less than one mile, analysis considers overall intersection delay along the corridor, similar to Urban Street analysis in Chapter 15 of the *Highway Capacity Manual.*

4.2 Project Trip Generation

Table 4–1 shows the traffic generation calculations for the proposed project. The existing camp is used year-round with two distinct types of activities depending on the time of year ("On-Season" during the summer months and "Off-Season" for the balance of the year). However, it is possible that both the summer camp and Retreat Center uses could occur simultaneously. Therefore, the project traffic generation was calculated for the maximum number of potential users, 748. Again, the current project description (November 2009) calls for a reduction in the number of users to 615. Thus, the analysis and findings of this report represent a worst-case scenario.

Consideration was given to the means by which camp occupants arrive, by utilizing a Vehicle Occupancy Ratio (VOR). This ratio accounts for multiple occupants in vehicles (i.e. carpools, vanpools, busses), which is an important aspect of this project's day-to-day operations. Many of the occupants will arrive via passenger vans and carpools. Based on past experience for events at the site, the applicant estimates that 40% of retreat guests arrive by van, 40% by carpool, while 20% are single occupancy. To further substantiate these percentages, data was obtained from the existing 78-acre Oakbridge Camp, which is located a few miles from the site. The EIR for the expansion of the camp was certified on December 4, 2002 (P77-055W). The Oakbridge Camp tracks their arrivals in terms of number of guests and number of vehicles. This camp is smaller but is also in a rural setting and since both are youth camps and the activities at the two camps are similar, it is logical that the carpool and vanpool arrival percentages would be similar. The Oakbridge Camp data showed that average auto occupancy was 2.7/vehicle, while average van occupancy was 14.6/vehicle. These occupancy rates closely match the rates assumed in *Table 4–1* of 2.33/vehicle and 15.0/vehicle respectively.

The applicant anticipates a potential condition of the Major Use Permit which would require them to maintain an on-site vehicle registration log to be submitted quarterly for the first year, and yearly thereafter to the satisfaction of the Director of the Department of Planning and Land Use. The vehicle log could be used to compare the actual project operations (e.g., numbers and types of vehicles, and arrival/departure times) with the site-specific assumptions used in this traffic study to validate the findings of the EIR.

Table 4–1 tabulates the total project traffic generation. The total project is calculated to generate approximately 275 ADT with 11 inbound/ 1 outbound trips during the AM peak hour and 21 inbound/ 1 outbound trips during the PM peak hour. These volumes include trips made by campers and retreat center guests, staff, and miscellaneous trips and deliveries (such as trips made by employees into town to purchase goods and/or supplies). By virtue of the site's operational characteristics (high carpool/vanpool percentages, weekend and off-peak arrivals/departures, on-site staff season-long), it generates very few weekday, commuter peak hour trips.

The occupancy of the camp and retreat center used in *Table 4–1* above is derived from the occupancy of the proposed structures, the expected reservations, proposed camp operations, and the employee counts, as outlined in the project description. The site-specific traffic generation method used for this project is appropriate, since the published SANDAG trip generation rates typically used by the County do not include rates for camps such as the proposed project. Also, as of November 2009, the proposed camp population has been reduced to 615 users, which is less than the maximum 748 users studied in this report. Therefore, the findings of this report represent a worst-case scenario, and are considered conservative.

TABLE 4–1
WEEKDAY PROJECT TRAFFIC GENERATION

Trip Type	AMOUNT	VOR[a]	INBOUND TRIPS	ADT[b]	AM PEAK[e] HOUR TRIPS		PM PEAK[e] HOUR TRIPS	
					IN	OUT	IN	OUT
Campers	523	15	35	70	0	0	0	0
Retreat Center Guests	175	2.33[d]	80	160	0	0	20	0
Staff	25[c]	2	12	25	10	0	0	0
Miscellaneous/Deliveries	10	1	10	20	1	1	1	1
TOTAL	–	–	–	***275***	***11***	***1***	***21***	***1***

Notes:
a. Vehicle Occupancy Rate = number of passengers per vehicle.
b. ADT = Average Daily Traffic.
c. Total staff is 50, about half of which arrive/depart weekly.
d. Retreat users are as follows: 40% Vanpool (15/van), 40% carpool (2/car) and 20% drive alone (1/car). This equals 175 guests arriving in 75 vehicles, which averages to 2.33 guests per vehicle. Ultimately, 50% of the total users arrive between 4 and 6 PM, or 25% during the peak hour. Thus, 20 of 80 (25%) of the inbound trips occur during the peak hour, one day a week.
e. The peak hour trip factors are based on the project description in Section 2.0 of this report. The arrival of carpools and retreat guests does not occur between 7 and 9 in the morning, and therefore, the AM peak hour trip estimates are zero.

4.3 Project Trip Distribution

The project-generated traffic was distributed to the street system based on project access, the characteristics of the roadway system, conversations with current staff, and the project site's relative location to metropolitan areas. Ninety (90) percent of the Retreat Center guest trips were estimated to come from the west (metropolitan San Diego), while ninety (90) percent of the staff trips were estimated to come from the east (Julian, Alpine). ***Figure 6a*** shows the regional traffic distribution for the "groups", while ***Figure 6b*** shows the "staff" and "miscellaneous" trip distribution. ***Figure 7*** shows the assignment of total project traffic based on these distributions. ***Figure 8*** shows the existing + project traffic volumes.

The pick-up/drop-off points for the Camp are determined by the local branch of the Salvation Army of which there are several in San Diego County. They vary from week to week.

4.4 Existing + Project Conditions

4.4.1 *Peak Hour Intersection Levels of Service*

Table 4–2a summarizes the existing + project intersections Level of Service. As seen in *Table 4–2*, with the addition of project traffic, the *signalized intersection* of SR 67/Dye Road continues to operate at LOS E during the AM peak hour an increase in delay of 1.6 seconds, while the PM peak hour continues to operate at LOS D. The increase in delay during the AM peak hour is less than the two seconds allowed at LOS E-operating locations. ***No significant direct project impacts are calculated.***

Table 4–2a also shows that the minor street movements at both *unsignalized intersections* at SR 67/ Archie Moore Road and SR 67/ Mussey Grade Road continue to operate at LOS F for both the AM and PM peak hours with the exception of the minor street movement for the SR 67 / Archie Moore Road intersection, which is calculated to operate at LOS C during the PM peak hour.

The County's significance criteria are based on the project's contribution to the "critical movement" of the unsignalized intersection. The critical movement is defined as a movement that experiences excessive queue, and therefore presumably a poor LOS. In situations where a minor street intersects a major road, the critical movement is the uncontrolled left-turn from the major street to the minor street. If the queues from through movements overflow the striped turn pocket, significant, negative effects on flow along the major road will occur. Conversely, queuing on the minor street, while inconvenient, will not affect overall intersection operations and delay the way it will on the major street.

At the SR 67/ Archie Moore Road intersection, the critical movement is the eastbound left-turn from SR 67 to Archie Moore Road. Were the queue to exceed the pocket at this location, it would have negative effects on eastbound through traffic on SR 67, which is the major road. Similarly, the critical movement at the SR 67/Mussey Grade Road is the westbound left-turn movement from SR 67 to Mussey Grade Road. Again, queues spilling back from the westbound pocket into westbound SR 67 traffic would have negative effects on the latter.

Table 4–2b shows a determination analysis of whether a critical movement is present, based on a comparison of the calculated 95th percentile (worst-case) critical queue to the existing turn pocket which stores the queue. This table shows that the calculated critical queues are accommodated within the existing turn pockets. ***No significant direct project impacts are calculated.***

While the project contribution is not part of the critical move, the lack potential negative effects of project traffic on either intersection can be understood in very practical terms. At the SR 67/Archie Moore Road intersection, the project simply does not contribute any trips to any turns. All trips are through-trips on SR 67, so effects of project traffic would logically be minimal.

At the SR 67/Mussey Grade Road intersection, the project contributes 10 AM peak hour westbound left-turning trips, and 0 AM/PM peak hour left-turning trips during the weekday commuter peaks (see *Figure 7, Project Traffic Volumes*). For the AM peak hour contribution, these trips should be

considered in the context of commuter flow. The AM peak hour direction of commuter flow is westbound in the project area (see *Figure 5, Existing Traffic Volumes*). Conversely, the counterflow (lighter traffic) direction is eastbound. *Table 4–1* has identified that the westbound left-turning trips are primarily potential staff trips, which are the only inbound trips during the weekday AM peak period. As they are westbound trips, they conflict only with the lighter eastbound counterflow traffic. This is why there is no queuing issue for the movement. It should also be noted these trips would not occur on a daily weekday basis, but only once a week as discussed in the project description.

The "zero" value for northbound left-turning project traffic volumes from Mussey Grade Road must be evaluated in the context of the project's proposed operations. The project description states that staff will depart the site on Saturday afternoons, while campers will depart on Sunday afternoons. The latter are the trips that would produce a northbound left-turn movement. The analysis in this report is for weekday commuter peak hours and daily (24-hour) operations. Thus, no outbound peak hour trips are presented since none would occur during the weekday peak hours per the description.

Appendix B contains the existing + project intersection analysis worksheets. The queuing summaries are presented in the HCM analysis worksheets.

4.4.2 *Segment Operations*

Table 4–3 summarizes the existing + project roadway segment Level of Service. As seen in *Table 4–3*, with the addition of project traffic, the segments along Mussey Grade Road are calculated to continue to operate at acceptable LOS B or better, assuming two-lane CE capacity. Maximum traffic volumes with the project are 3,305 ADT, which are within the 4,500 ADT threshold identified for non-CE roadways . ***No significant direct project impacts are calculated.***

4.4.3 *Two-Lane Highway Analysis*

Table 4–4 shows that with the addition of project traffic to the two-lane highway segment, the two-lane highway segment would continue to operate at LOS F based on the County's thresholds for two-lane highway segments with signalized intersection spacing greater than one-mile. The maximum project-attributable increase in ADT due is 212 ADT to this segment, which is less than the County's threshold of 225 ADT. ***No significant direct project impacts are calculated.***

4.5 Existing + Project + Cumulative Projects Conditions

According to the *County of San Diego Report Format & Content Requirements* dated June 30, 2009, a project generating between 200-500 ADT such as the proposed project would not require a cumulative analysis if the applicant plans to participated in the TIF program (as the proposed project applicant does). Nonetheless, while a required, a cumulative analysis was conducted to be conservative.

Cumulative projects are other projects in the study area that will add traffic to the local circulation system in the near future. Based on the discussions with County of San Diego staff, a review of recently completed LLG projects within the community of Ramona, and researching the cumulative section from the approved "*Montecito Ranch*" Environmental Impact Report (EIR), April 2008, it

was determined that traffic data from the "*Montecito Ranch*" cumulative section would be utilized for this project.

Figure 9 shows the cumulative projects traffic volumes. ***Figure 10*** shows the existing + project + cumulative projects weekday traffic volumes.

4.5.1 *Peak Hour Intersection Levels of Service*

Table 4–2a summarizes the existing + project + cumulative projects intersections Level of Service. As seen in *Table 4–2a*, with the addition of cumulative and project traffic, all three study area intersections are calculated to operate at LOS F during both the AM and PM peak hours. The cumulative delay to the signalized SR 67/ Dye Road signalized intersection exceeds the County's allowable 1 second of increase to a LOS F intersection. ***A significant cumulative impact is calculated at this signalized intersection.***

Table 4–2b shows the critical movement determination for the existing + project + cumulative project conditions. This table shows increases in critical queues at the SR 67/Archie Moore Road and SR 67/Mussey Grade Road intersections, which are calculated to operate at LOS F as described above. ***Significant cumulative impacts are calculated at these unsignalized intersections.***

Appendix B contains the existing + project + cumulative projects intersection analysis worksheets.

4.5.2 *Segment Operations*

Table 4–3 summarizes the existing + project + cumulative projects roadway segment Level of Service. As seen in *Table 4–3*, with the addition of cumulative project traffic, the segments along Mussey Grade Road are calculated to continue to operate at acceptable LOS B, assuming two-lane CE capacity. Maximum traffic volumes with cumulative projects are 3,585 ADT, which are within the 4,500 ADT threshold identified for non-CE roadways. ***No significant cumulative impacts are calculated at these locations.***

4.5.3 *Two-Lane Highway Analysis*

Table 4–4 shows that with the addition of cumulative project traffic to the two-lane highway segment, the two-lane SR 67 segment west of Mussey Grade Road would continue to operate at LOS F. The cumulative project-attributable increase on this segment is 10,672 ADT, which exceeds the allowable increase of 225 ADT to an LOS F operating two-lane highway segment. ***A significant cumulative impact is calculated at this location.***

TABLE 4–2A
NEAR-TERM INTERSECTION OPERATIONS

Intersection	Control Type	Move-ment	Peak Hour	Existing		Existing + Project			Existing + Project + Cumulative Projects		Impact Type
				Delay[a]	LOS[b]	Delay	LOS	Δ[c]	Delay	LOS	
1. SR 67 / Archie Moore Road	TWSC[d]	SB L	AM	>50.1	F	>50.1	F	0[e]	>50.1	F	Cumulative
			PM	19.5	C	19.7	C	0[e]	>50.1	F	
2. SR 67 / Mussey Grade Road	TWSC	NB L	AM	>50.1	F	>50.1	F	0[f]	>50.1	F	Cumulative
			PM	>50.1	F	>50.1	F	0[f]	>50.1	F	
3. SR 67 / Dye Road	Signal	All	AM	71.0	E	72.6	E	1.6	**>80.1**	**F**	Cumulative
			PM	38.0	D	38.0	D	0.0	**70.5**	**E**	

Footnotes:

a. Average delay expressed in seconds per vehicle.
b. Level of Service.
c. Δ denotes the number of project trips added to the critical movement
d. TWSC – Two-Way Stop Controlled intersection. Minor street left turn delay is reported.
e. No critical movement is identified for this intersection since the EB left does not exceed the existing pocket. See Section 4.4 for more details.
f. No critical movement is identified for this intersection since the WB left does not exceed the existing pocket. See Section 4.4 for more details.

General Notes:

1. SB L = "Southbound Left", etc.
2. Shading and BOLD typeface indicates a potentially significant impact.

SIGNALIZED		UNSIGNALIZED	
DELAY/LOS THRESHOLDS		DELAY/LOS THRESHOLDS	
Delay	LOS	Delay	LOS
0.0 < 10.0	A	0.0 < 10.0	A
10.1 to 20.0	B	10.1 to 15.0	B
20.1 to 35.0	C	15.1 to 25.0	C
35.1 to 55.0	D	25.1 to 35.0	D
55.1 to 80.0	E	35.1 to 50.0	E
> 80.1	F	> 50.1	F

TABLE 4–2B
UNSIGNALIZED INTERSECTION "CRITICAL MOVEMENT" DETERMINATION

Unsignalized Intersection	Potential Critical Movement	Pocket Length (feet)	Peak Hour	Existing		Existing + Project		Existing + Project + Cumulative	
				Queue (feet) [a]	Exceeds? [b]	Queue (feet)	Exceeds?	Queue (feet)	Significant? [c]
1. SR 67 / Archie Moore Road	Eastbound Left	560	AM	10	No	10	No	129	Yes
			PM	21	No	21	No	129	Yes
2. SR 67 / Mussey Grade Road	Westbound Left	150	AM	2	No	3	No	5	Yes
			PM	22	No	23	No	46	Yes

Footnotes:

a. The calculated 95th percentile queue is shown in feet. Queues are calculated based on approaching volumes over the peak hour period. Queues of less than 25' (length of one queued vehicle) are calculated when the sum of hourly approaching vehicles is too low for a standing queue to develop.

b. Does queue exceed pocket length? If yes, then critical movement exists.

c. While the queue does not technically exceed the pocket length with the addition of cumulative project traffic, the minor street LOS for each intersection is LOS F (See *Table 4–2A*). The project adds to the overall cumulative projects' traffic and the LOS F operations; its contribution is considered significant.

TABLE 4–3
NEAR-TERM STREET SEGMENT OPERATIONS

Street Segment	Existing Capacity (LOS E)[a]	Existing		Existing + Project			Existing + Project + Cumulative		Impact Type
		ADT[b]	LOS [c]	ADT	LOS	Δ[d]	ADT	LOS	
Mussey Grade Road									
South of SR 67	16,200	3,030	B	3,305	B	275	3,585	B	None
South of Dos Picos Park Road	16,200	1,120	A	1,395	A	275	1,675	B	None

Footnotes:

a. Capacities based on County of San Diego Roadway Classification & LOS table for a two-lane CE roadway (See Appendix C).

b. Average Daily Traffic

c. Level of Service

d. Δ denotes a project-induced increase in ADTs.

TABLE 4–4
HCM TWO-LANE HIGHWAY ANALYSIS

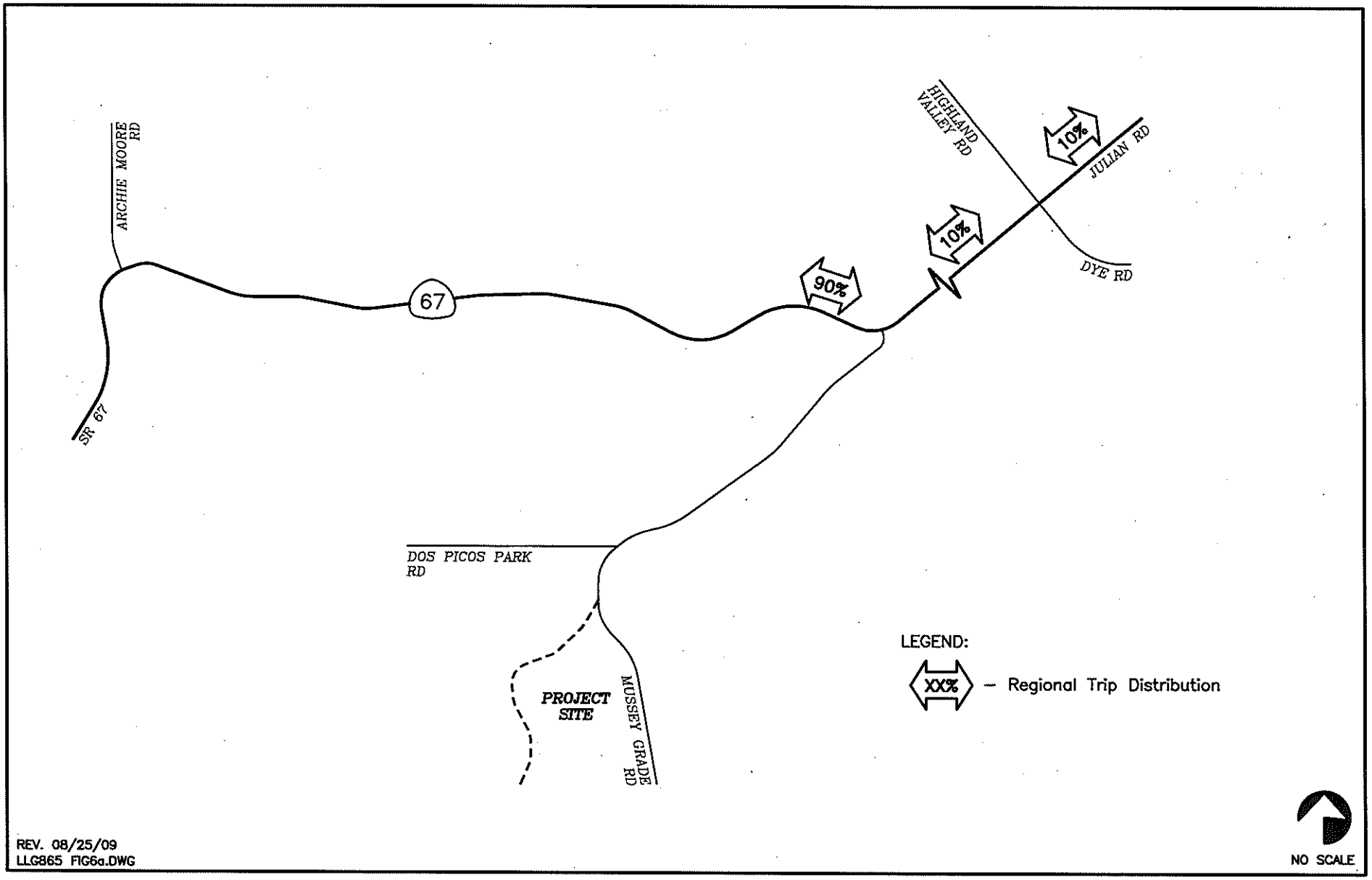
Two-Lane Highway Segment – SR 67	Existing		Existing + Project			Existing + Project + Cumulative		
	Volume	LOS [a]	Volume	Δ [b]	Sig? [c]	Volume	Δ	Sig?
Archie Moore Road to Mussey Grade Road	24,500	F	24,712	212	No	35,172	10,672	Yes

Footnotes:

a. Level of Service. County threshold for LOS F for two lane highway segment with signalized intersection spacing > 1 mile = 22,900 ADT.

b. Δ = Increase in project or cumulative projects' ADT

c. Sig = direct or cumulative significant impact. County thresholds allow for 225 ADT before impact is calculated.



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LLG865 FIG6a.DWG

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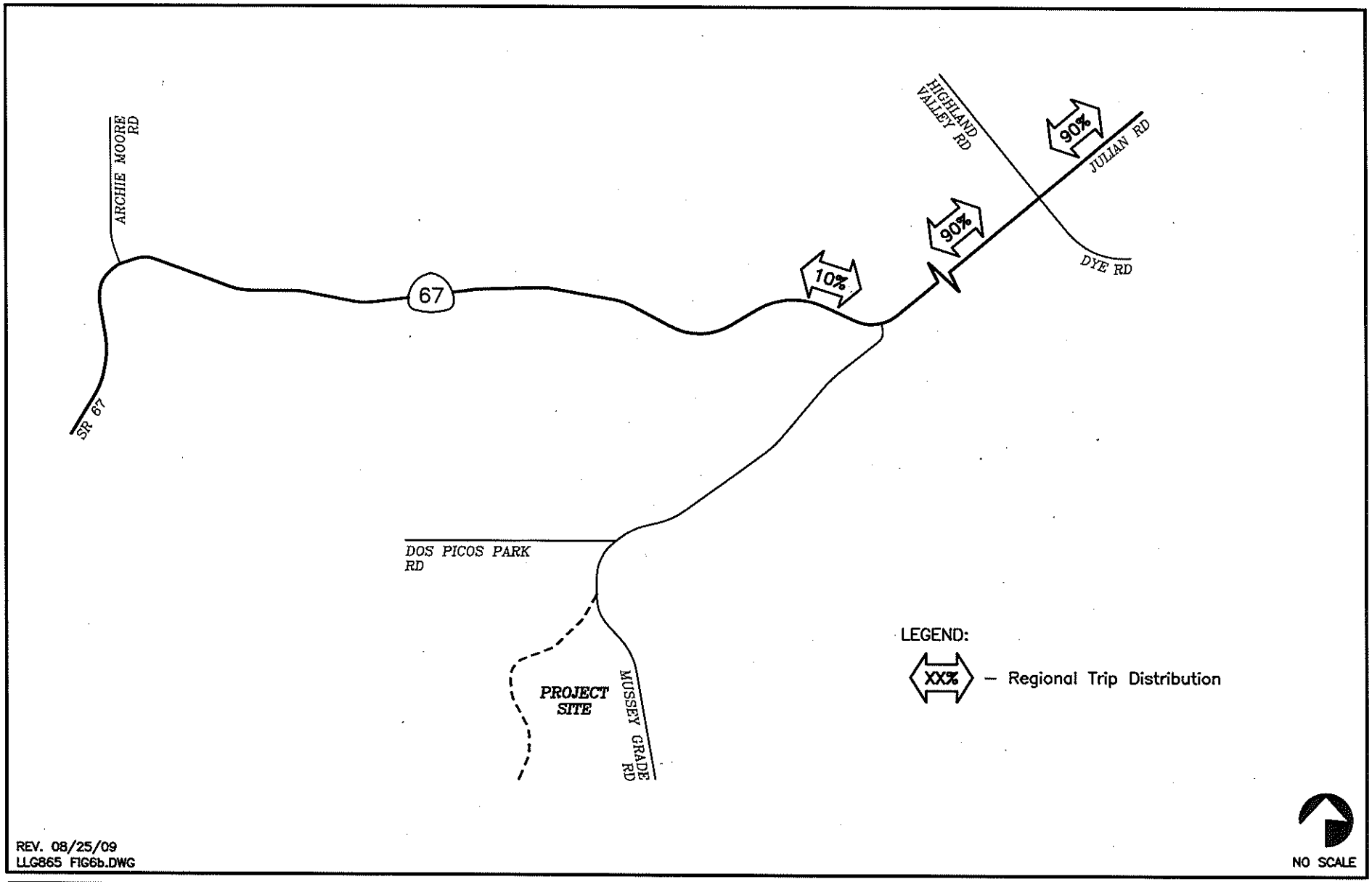
Figure 6a

"GROUP" TRAFFIC DISTRIBUTION

SIERRA DEL MAR



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LLG865 FIG6b.DWG

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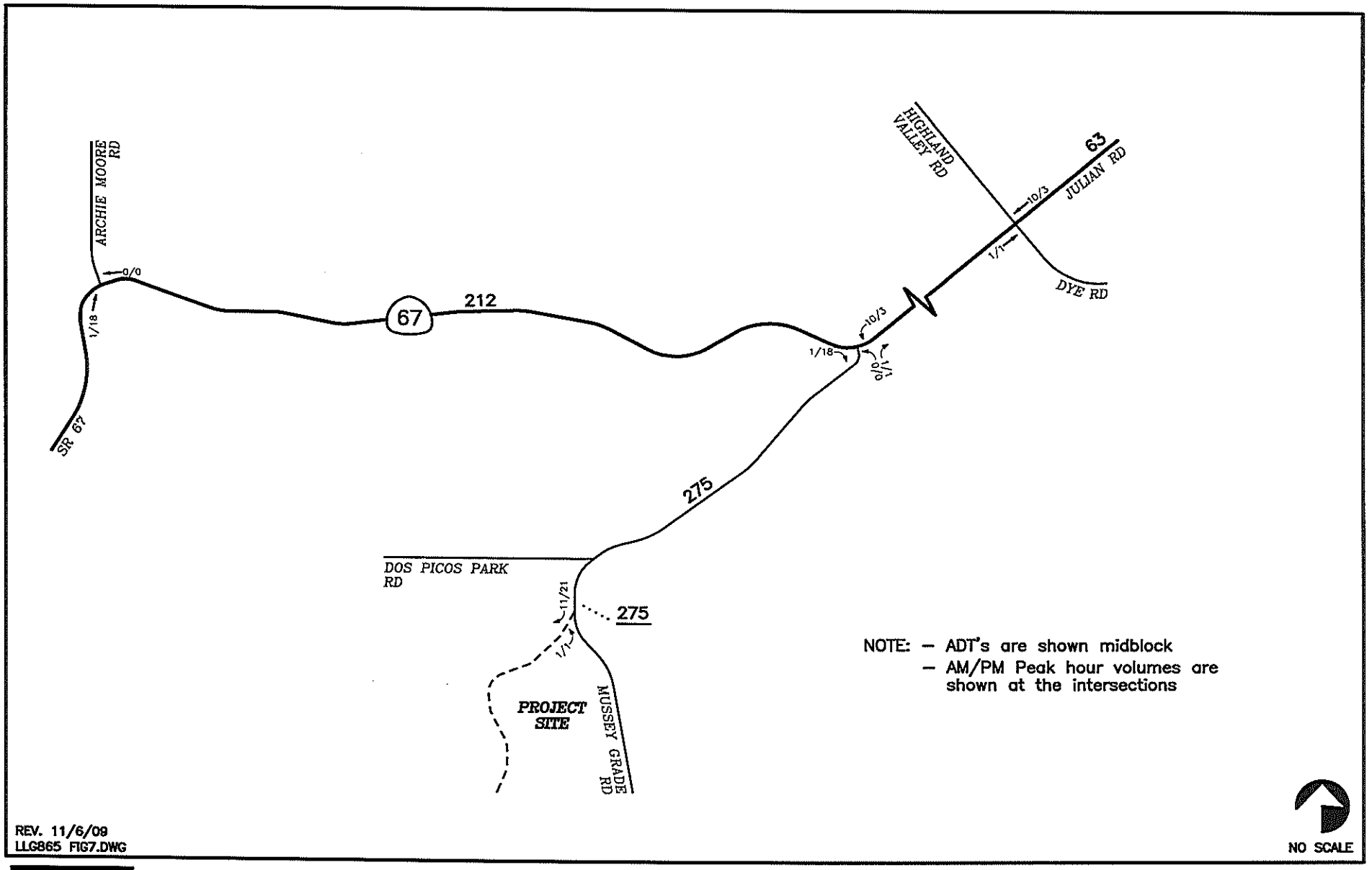
engineers

Figure 6b

STAFF/MISCELLANEOUS TRAFFIC DISTRIBUTION

SIERRA DEL MAR



LINSCOTT LAW & GREENSPAN engineers

Figure 7

PROJECT TRAFFIC VOLUMES AM/PM PEAK HOURS & ADTs

SIERRA DEL MAR

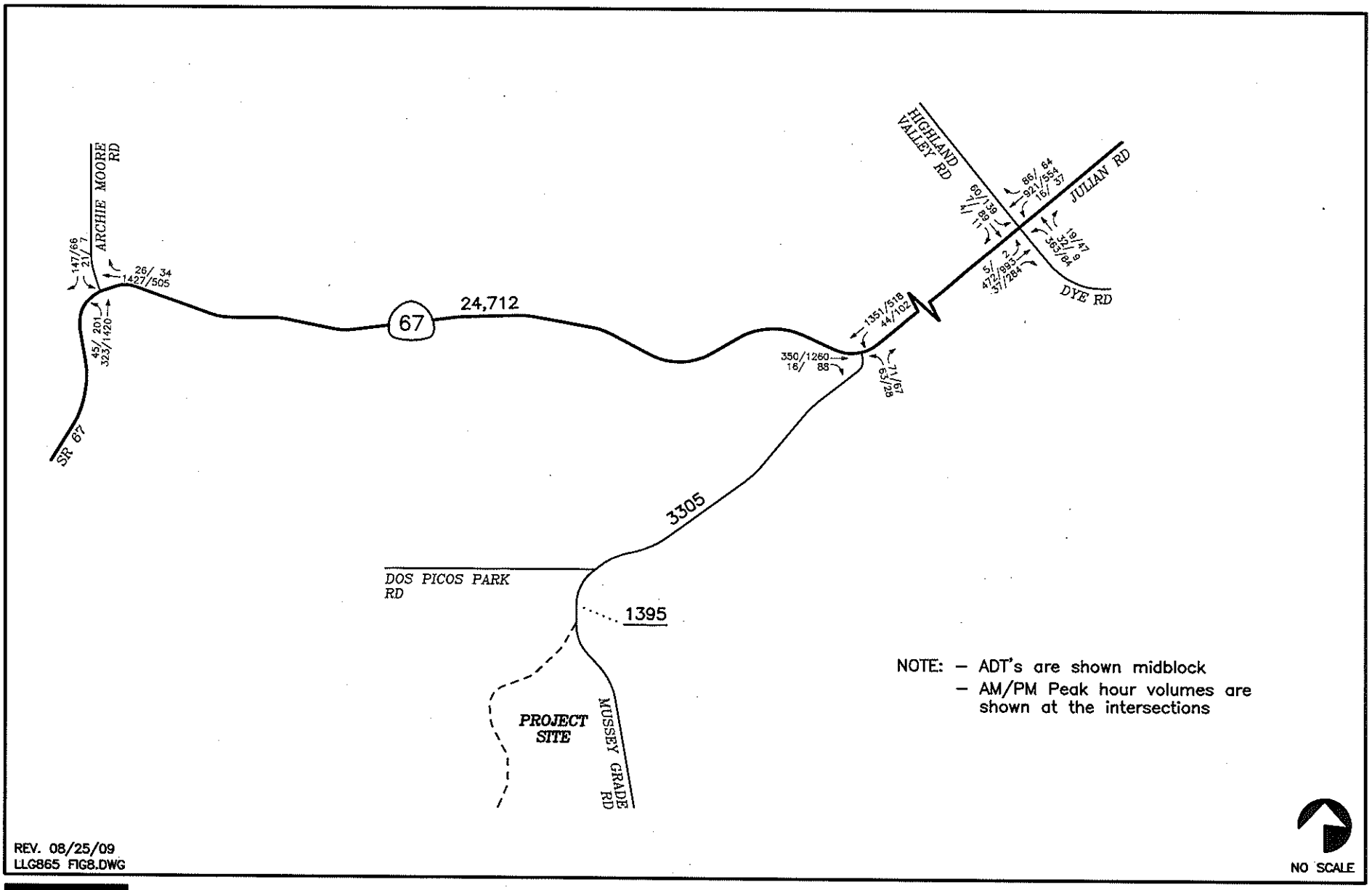


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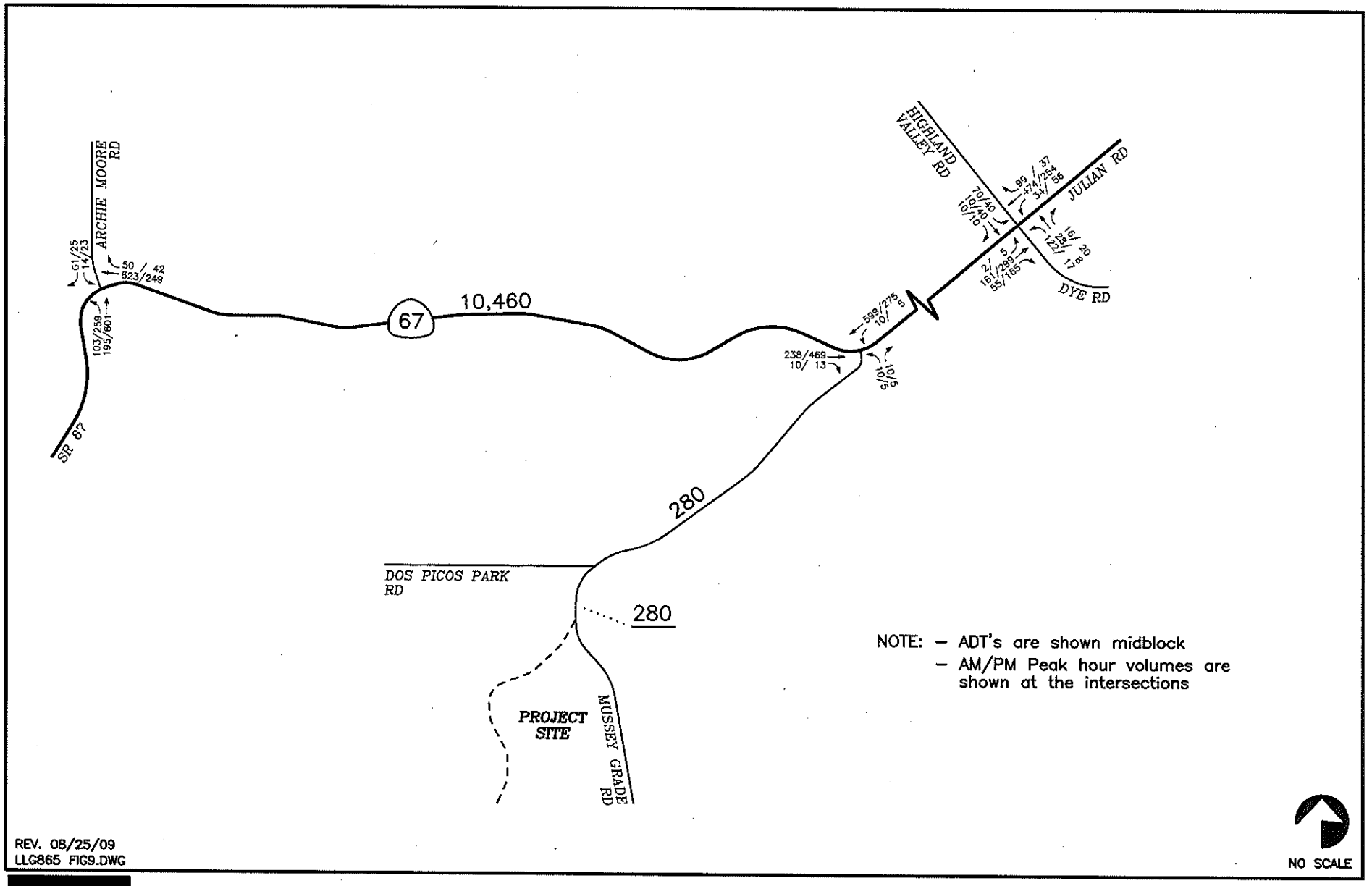
Figure 8

EXISTING + PROJECT TRAFFIC VOLUMES AM/PM PEAK HOURS & ADTs

SIERRA DEL MAR



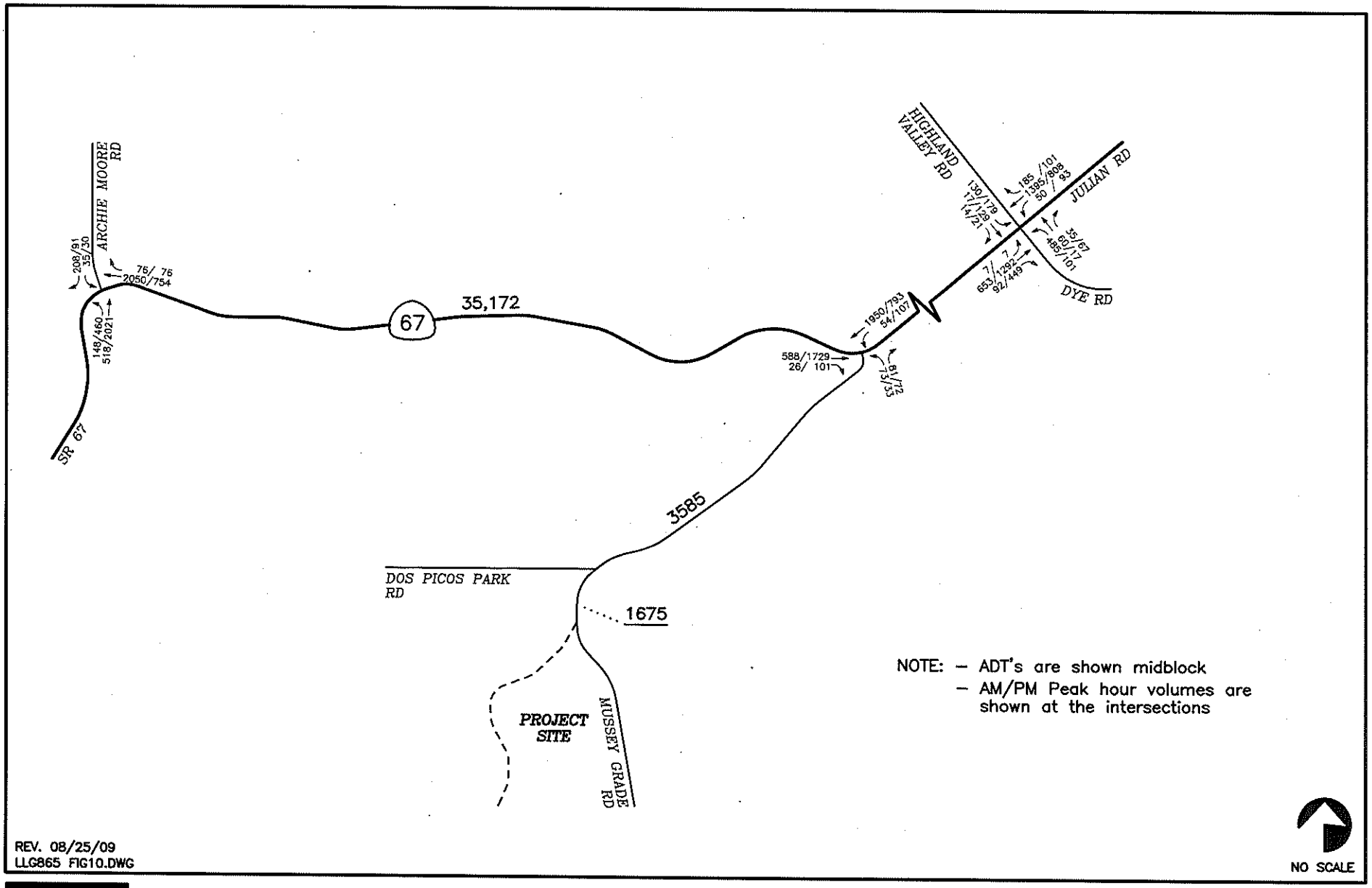
REV. 08/25/09
LLG865 FIG9.DWG

LINSCOTT LAW & GREENSPAN engineers

Figure 9

NEAR-TERM CUMULATIVE TRAFFIC VOLUMES AM/PM PEAK HOURS & ADTs

SIERRA DEL MAR



REV. 08/25/09
LLG865 FIG10.DWG

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Figure 10

EXISTING + PROJECT + CUMULATIVE PROJECTS TRAFFIC VOLUMES AM/PM PEAK HOURS & ADTs

SIERRA DEL MAR

5.0 PROJECT ACCESS, ON-SITE CIRCULATION & PARKING

5.1 Project Access

Regional access to the site is via Mussey Grade Road to SR 67. Mussey Grade Road is a Non-Circulation Element (CE) public road. Two-lane CE road capacity criteria has been used for the purpose of roadway segment LOS assessment, but Mussey Grade Road functions similar to a Non-CE Residential Collector which can accommodate local traffic volumes up to 4,500 ADT with stable flow. As stated in the Public Road Standards, Levels of Service are not applied to residential streets since their primary purpose is to serve abutting lots, not carry through traffic.

Traffic volumes (including project and cumulative project traffic) on Mussey Grade Road do not exceed 3,600 ADT, which is within the 4,500 ADT threshold described above. The assessment using two-lane CE capacity also shows LOS B operations under all conditions. No direct or cumulative project impacts to Mussey Grade Road are calculated.

The site access is currently a gated, private graded dirt road to Mussey Grade Road. Once on-site, a main dirt road provides access to the various portions of the camp.

5.2 On-Site Circulation

The interior circulation concept for the Salvation Army Specific Plan consists of a network of meandering, county-style roads. Primary ingress/egress to the site would remain from the existing entry and main dirt access road off of Mussey Grade Road. All internal roads will be paved with asphaltic concrete with varying widths from a minimum of 18 feet to 24 feet, pursuant to letters from the Ramona Fire Department/CDF and the Department of Public Works regarding the project's submitted "Request for Exception to Private Road Standards".

A new road is envisioned to spur off the existing main road, towards the new hub of the camp, and would replace the existing access roads to the cabins as well as a portion of the main road that currently extends to the existing Ranch House. Several secondary access road branches would branch off of the main access road, providing access to specific areas of the site.

The roadway locations and sizes are designed to facilitate the efficient movement of motor vehicles throughout the site, including emergency vehicles. Some existing roads on-site will be paved to between 18 and 21-feet-wide within the existing roadbed due to environmental constraints. Emergency access would continue to be provided by the main access road, as well as a secondary emergency access road located south of the property, that parallels the Wildwood Ranch northern property boundary.

The on-site circulation is expected to operate well.

The sight distance of the project entrance/Mussey Grade Road intersection is adequate based on an analysis by the Civil Engineer contained in ***Appendix D***. The sight distance evaluation was updated in October 2009.

5.3 Parking

5.3.1 *Retreat Center*

The Retreat Center component of the project consists of a group of 175 people. This calculates to 75 parking spaces using the Vehicle Occupancy Ratio described in the report (40% vanpool, 40% carpool and 20% single-occupant). The derivation of these percentages is outlined earlier in this report. Thirty-five (35) additional parking spaces would be needed for staff and "miscellaneous" parkers. Therefore, a total of 105 parking spaces are estimated to be required. Obviously, if a large percentage of the group drove alone, a greater amount of parking would be needed.

5.3.2 *Special Event*

The client has estimated that a maximum of 748 guests could use the site at once for special events. Assuming the same Vehicle Occupancy Ratios as utilized in the report, about 320 parking spaces would be required.

5.3.3 *Total Area*

The total parking spaces required for the retreat center is 105 spaces, even if the retreat and summer camp are run concurrently, since the campers are dropped off at the site and their vehicles do not park. A special event with a maximum of 748 guests is calculated to require a total of 320 spaces. Approximately 300 parking spaces (188 designated; 112 overflow spaces) would be provided on the site with the proposed project. Since the overflow parking will be provided as open fields, and spaces were calculated using acreage required for parking lots, i.e. including lanes, etc., the shortfall of 20 spaces could be accommodated in the existing parking area with a valet-type arrangement that maximized the parking yield from the designated area of approximately 2.05 acres. Parking impacts would be less than significant.

The traffic analysis assumes that the maximum number of users (748) is at the site. The trip generation, intersection analysis and street segment analysis is based on this worst-case assumption. In addition, the significance of impacts was determined based on this assumption. Special events are expected to have less than 748 people on-site. The exact number of attendees will vary widely depending on the type of event. However, since the special events cannot exceed 748 maximum occupancy, this traffic analysis "covers" special events.

6.0 SPECIAL EVENT TRAFFIC

The traffic analysis assumes that the maximum number of users (748) is at the site. The trip generation, intersection analysis and street segment analysis is based on this worst-case assumption. In addition, the significance of impacts was determined based on this assumption. The site may hold special events up to the maximum 748 users assumed in this traffic study, although the applicant expects most special events to have less than 748 people on-site. Special events would be held on weekend days, be restricted to not occur during weekday commuter periods, and be subject to the *County of San Diego Department of Land Use's published Guidelines for Temporary Uses on Parcels Governed by a Major Use Permit.*

7.0 IMPACTS SUMMARY

7.1 Summary of Impacts / Mitigation Measures

The following is a description of the calculated significant impacts for the proposed project based on the established Significance Criteria along with recommendations for mitigation measures at the impacted locations.

7.2 Significance of Impacts

7.2.1 *Direct Impacts*

The *Salvation Army – Sierra Del Mar* project adds trips to the existing roadway network, but does not exceed the County of San Diego thresholds for direct impacts. No direct impacts area calculated.

7.2.2 *Cumulative Impacts*

The project adds traffic to the following cumulatively impacted locations:

a. SR 67/ Archie Moore Road unsignalized intersection

b. SR 67/ Mussey Grade Road unsignalized intersection

c. SR 67/ Dye Road signalized intersection

d. SR 67 Two-Lane Highway segment: between Archie Moore Road and Mussey Grade Road

7.3 Mitigation Measures

a. - d. – Participate in the County of San Diego's Transportation Impact Fee (TIF) Program through fee contributions.

8.0 SUMMARY OF RECOMMENDED PROJECT DESIGN FEATURES, IMPACTS AND MITIGATION

Based on the County of San Diego significance criteria, the project would result in significant cumulative impacts to the local roadways and intersections within the Ramona community and regional roadway facilities. Based on the calculated cumulative impacts, the following mitigation measures are recommended:

- Pay the appropriate County Traffic Impact Fee to mitigate cumulative impacts to below a level of significance.

Table 8–1 summarizes the recommended mitigation measures and improvements.

TABLE 8–1
IMPACT/MITIGATION MEASURE SUMMARY

Location:	Impact Type	Mitigation Measure
• SR 67 / Archie Moore Road Unsignalized Intersection	Cumulative	Pay the appropriate TIF.
• SR 67 / Mussey Grade Road Unsignalized Intersection	Cumulative	Pay the appropriate TIF.
• SR 67 / Dye Road Signalized Intersection	Cumulative	Pay the appropriate TIF.
• SR 67 Two-Lane Highway Segment: Archie Moore Road to Mussey Grade Road	Cumulative	Pay the appropriate TIF.

9.0 REFERENCES

Highway Capacity Manual (HCM) 2000

SANDAG (Not So) Brief Guide of Vehicular Traffic Generation Rates for the San Diego Region, April 2002.

Guidelines for Determining Significance, adopted September 26, 2006 and revised effective June 30, 2009.

County's General Plan Public Facilities Element (PFE) Transportation, Policy 1.1

County of San Diego Report Format & Content Requirements for Transportation and Traffic, revised June 30, 2009.

County of San Diego Circulation Element

County of San Diego Transportation Impact Fee, TIF Program Update January 2008

10.0 List of Preparers and Organizations Contacted

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Organizations Contacted

County of San Diego, Department of Public Works Transportation Division

True Count (traffic data provider), Mr. Gustavo Garcia

LINSCOTT LAW & GREENSPAN engineers

TECHNICAL APPENDICES

SALVATION ARMY

SIERRA DEL MAR DIVISIONAL CAMP

Ramona, California
September 4, 2009
Revised December 22, 2009

Prepared for:
The County of San Diego
On behalf of:
BRG Consulting

LLG Ref. 3-99-0865

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APPENDIX A

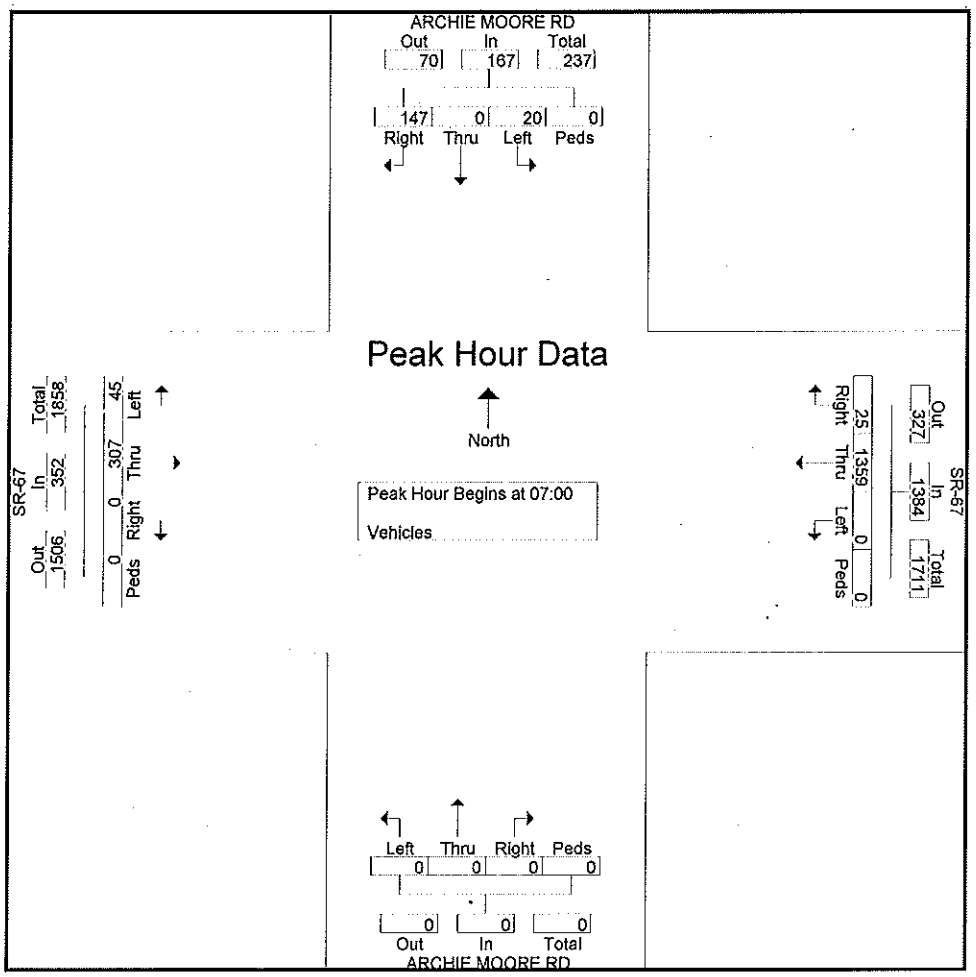
INTERSECTION VOLUME DATA SHEETS

True Count

3401 First Ave #123
San Diego, CA 92103

File Name : 9076.01.ARCHIE MOORE RD.SR-67
Site Code : 00000000
Start Date : 8/25/2009
Page No : 2

	ARCHIE MOORE RD Southbound					SR-67 Westbound					ARCHIE MOORE RD Northbound					SR-67 Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 to 11:45 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00																					
07:00	3	0	**52**	0	**55**	0	359	6	0	365	0	0	0	0	0	11	78	0	0	89	**509**
07:15	2	0	30	0	32	0	342	5	0	347	0	0	0	0	0	**17**	58	0	0	75	454
07:30	6	0	36	0	42	0	**362**	4	0	**366**	0	0	0	0	0	6	76	0	0	82	490
07:45	**9**	0	29	0	38	0	296	**10**	0	306	0	0	0	0	0	11	**95**	0	0	**106**	450
Total Volume	20	0	147	0	167	0	1359	25	0	1384	0	0	0	0	0	45	307	0	0	352	1903
% App. Total	12	0	88	0		0	98.2	1.8	0		0	0	0	0		12.8	87.2	0	0		
PHF	.556	.000	.707	.000	.759	.000	.939	.625	.000	.945	.000	.000	.000	.000	.000	.662	.808	.000	.000	.830	.935

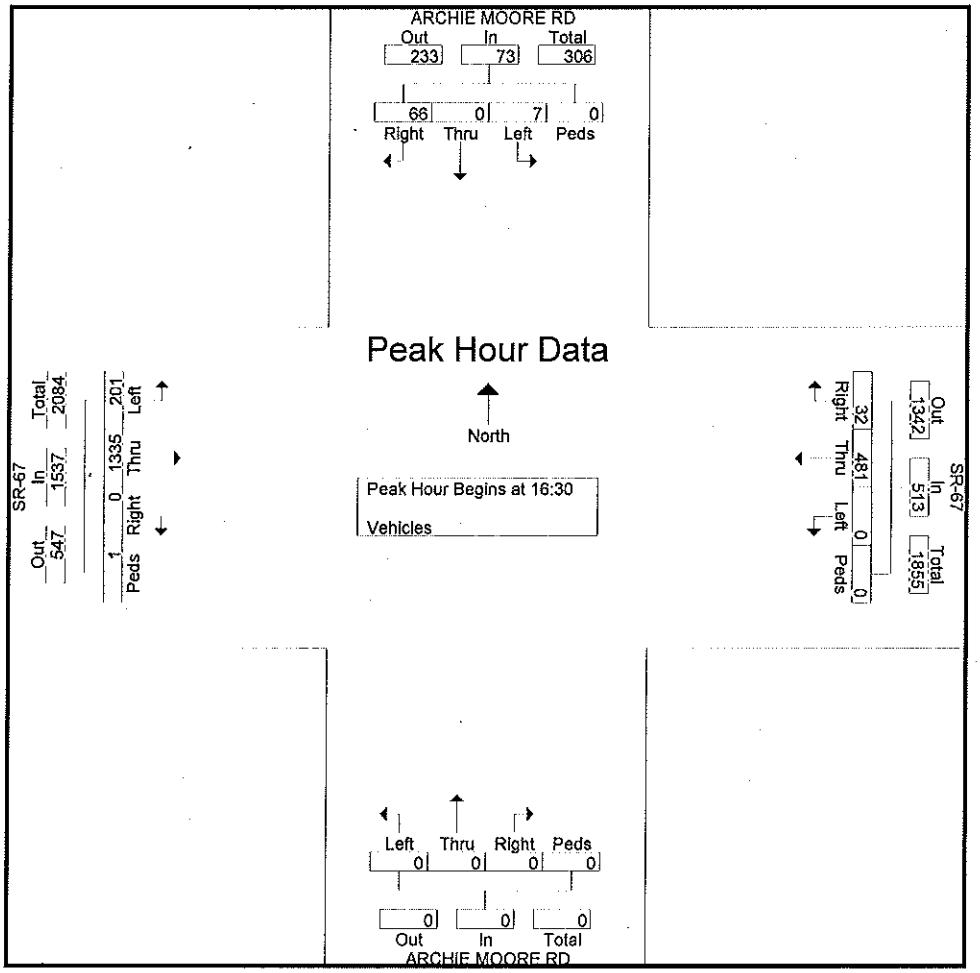


True Count

3401 First Ave #123
San Diego, CA 92103

File Name : 9076.01.ARCHIE MOORE RD.SR-67
Site Code : 00000000
Start Date : 8/25/2009
Page No : 3

	ARCHIE MOORE RD Southbound					SR-67 Westbound					ARCHIE MOORE RD Northbound					SR-67 Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 12:00 to 17:45 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 16:30																					
16:30	1	0	**20**	0	**21**	0	125	4	0	129	0	0	0	0	0	37	**342**	0	0	379	529
16:45	**4**	0	9	0	13	0	114	5	0	119	0	0	0	0	0	44	335	0	0	379	511
17:00	1	0	17	0	18	0	**128**	**13**	0	**141**	0	0	0	0	0	51	328	0	**1**	380	539
17:15	1	0	20	0	21	0	114	10	0	124	0	0	0	0	0	**69**	330	0	0	**399**	**544**
Total Volume	7	0	66	0	73	0	481	32	0	513	0	0	0	0	0	201	1335	0	1	1537	2123
% App. Total	9.6	0	90.4	0		0	93.8	6.2	0		0	0	0	0		13.1	86.9	0	0.1		
PHF	.438	.000	.825	.000	.869	.000	.939	.615	.000	.910	.000	.000	.000	.000	.000	.728	.976	.000	.250	.963	.976

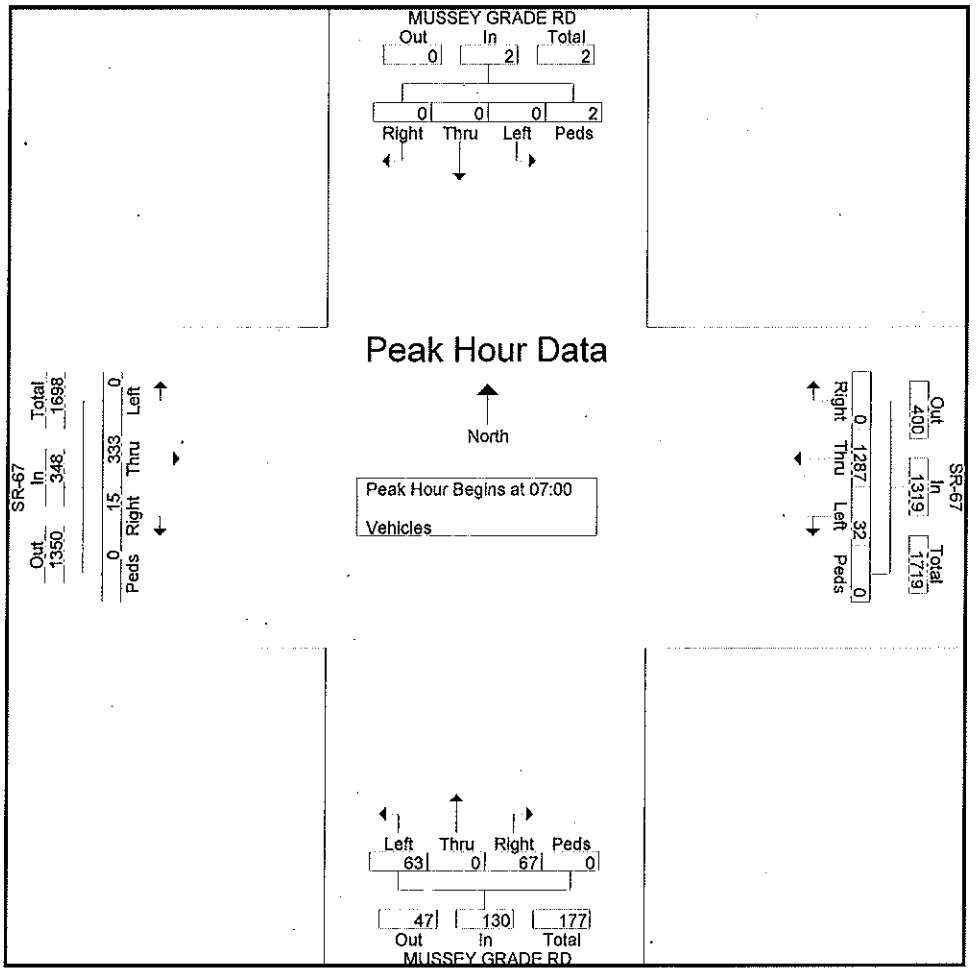


True Count

3401 First Ave #123
San Diego, CA 92103

File Name : 9076.02.MUSSEY GRADE RD.SR-67
Site Code : 00000000
Start Date : 8/25/2009
Page No : 2

	MUSSEY GRADE RD Southbound					SR-67 Westbound					MUSSEY GRADE RD Northbound					SR-67 Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 to 11:45 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00																					
07:00	0	0	0	0	0	8	327	0	0	335	**24**	0	14	0	**38**	0	82	3	0	85	458
07:15	0	0	0	0	0	6	**357**	0	0	**363**	16	0	**22**	0	38	0	74	2	0	76	**477**
07:30	0	0	0	0	0	6	320	0	0	326	12	0	13	0	25	0	83	**5**	0	88	439
07:45	0	0	0	**2**	**2**	**12**	283	0	0	295	11	0	18	0	29	0	**94**	5	0	**99**	425
Total Volume	0	0	0	2	2	32	1287	0	0	1319	63	0	67	0	130	0	333	15	0	348	1799
% App. Total	0	0	0	100		2.4	97.6	0	0		48.5	0	51.5	0		0	95.7	4.3	0		
PHF	.000	.000	.000	.250	.250	.667	.901	.000	.000	.908	.656	.000	.761	.000	.855	.000	.886	.750	.000	.879	.943

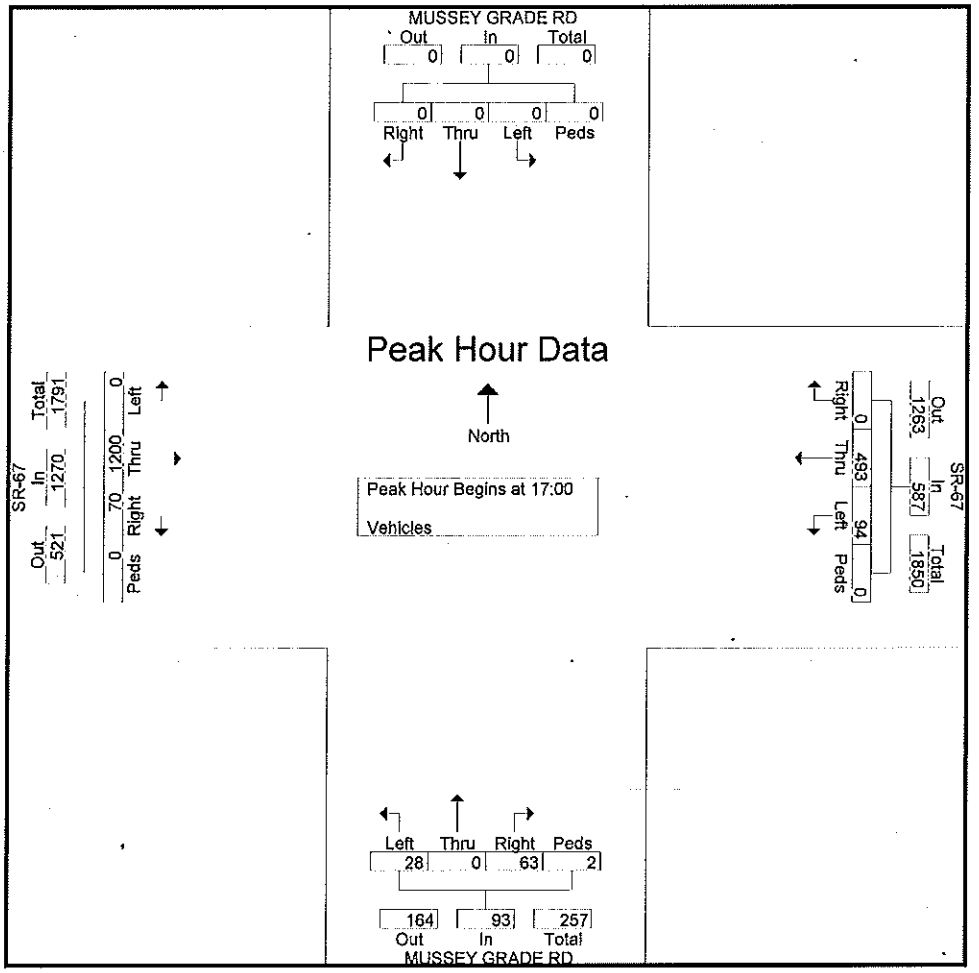


True Count

3401 First Ave #123
San Diego, CA 92103

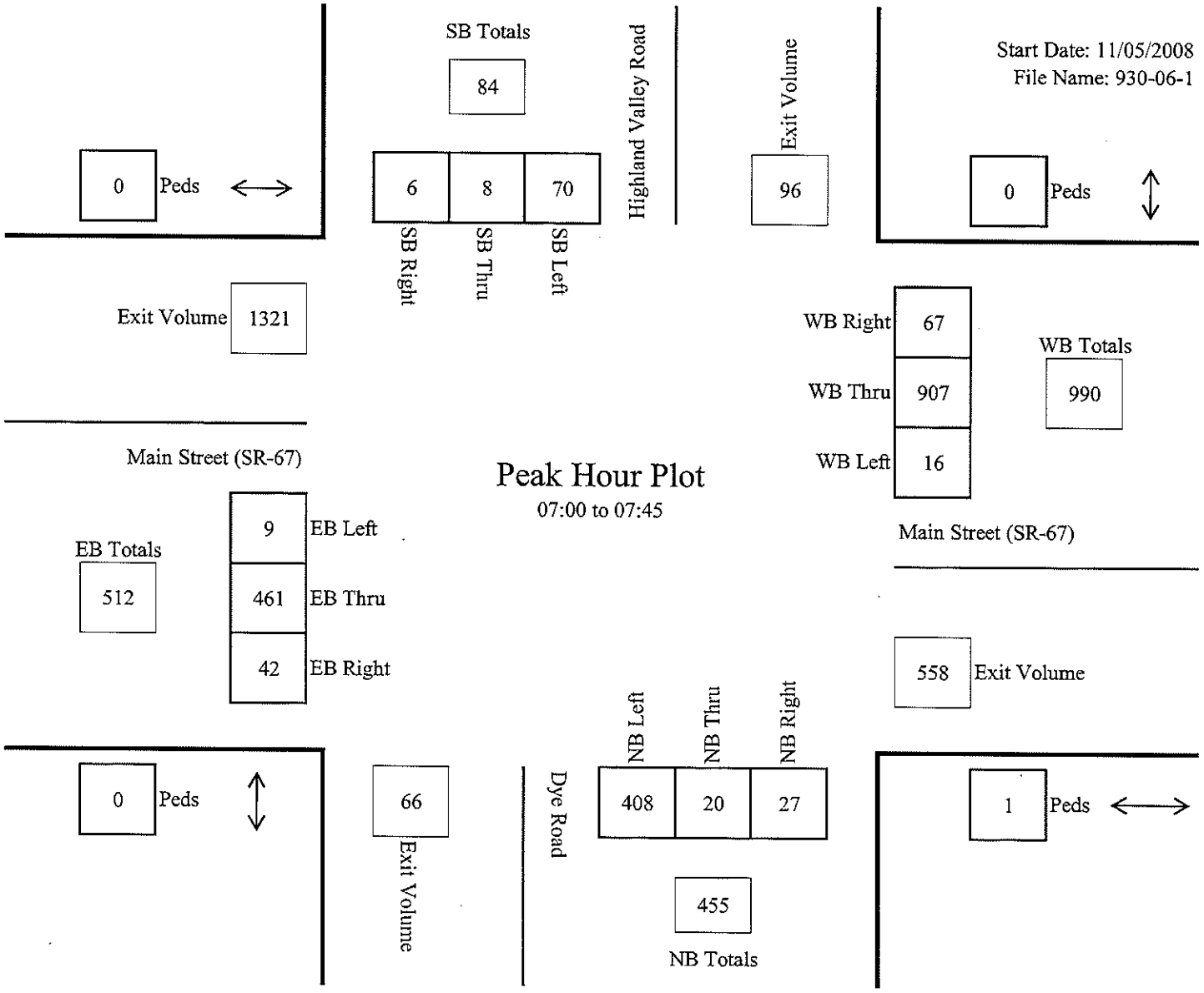
File Name : 9076.02.MUSSEY GRADE RD.SR-67
Site Code : 00000000
Start Date : 8/25/2009
Page No : 3

	MUSSEY GRADE RD Southbound					SR-67 Westbound					MUSSEY GRADE RD Northbound					SR-67 Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 12:00 to 17:45 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 17:00																					
17:00	0	0	0	0	0	24	**157**	0	0	**181**	7	0	**23**	**1**	**31**	0	288	18	0	306	**518**
17:15	0	0	0	0	0	**30**	116	0	0	146	**10**	0	11	0	21	0	286	19	0	305	472
17:30	0	0	0	0	0	19	108	0	0	127	5	0	18	1	24	0	291	12	0	303	454
17:45	0	0	0	0	0	21	112	0	0	133	6	0	11	0	17	0	**335**	**21**	0	**356**	506
Total Volume	0	0	0	0	0	94	493	0	0	587	28	0	63	2	93	0	1200	70	0	1270	1950
% App. Total	0	0	0	0		16	84	0	0		30.1	0	67.7	2.2		0	94.5	5.5	0		
PHF	.000	.000	.000	.000	.000	.783	.785	.000	.000	.811	.700	.000	.685	.500	.750	.000	.896	.833	.000	.892	.941



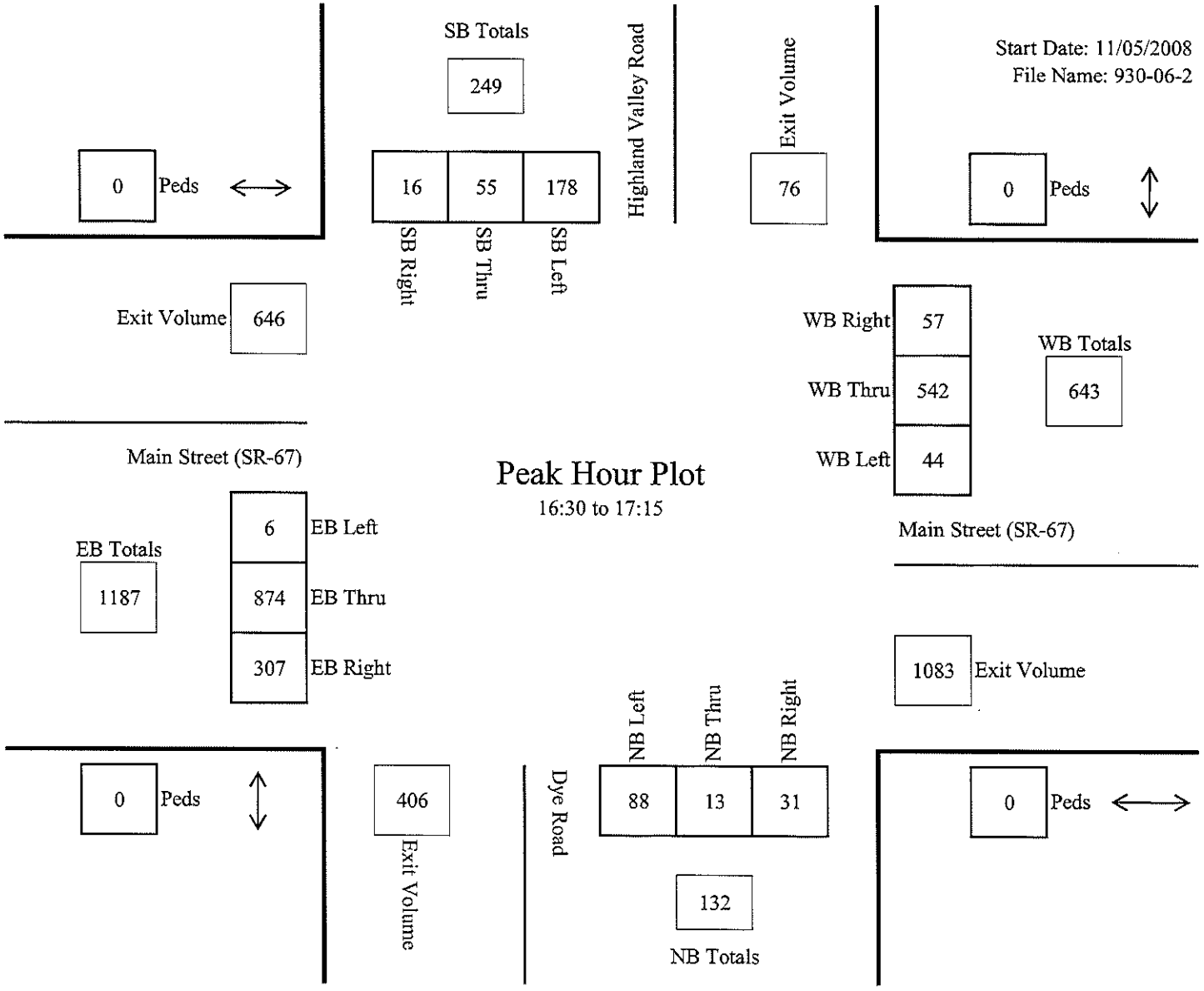
Linscott Law & Greenspan

4542 Ruffner Street, Suite 100, San Diego, CA 92111



Linscott Law & Greenspan

4542 Ruffner Street, Suite 100, San Diego, CA 92111



MetroCount Traffic Executive
Vehicle Counts

VehicleCount-1695 -- English (ENU)

Datasets:

Site:	**[9077.01] MUSSEY GRADE RD (SOUTH OF HWY-67) NORTHBOUND**
Direction:	7 - North bound A>B, South bound B>A., **Lane:** 0
Survey Duration:	19:55 Monday, August 24, 2009 => 11:15 Wednesday, August 26, 2009
File:	C:\Users\Gus\True Count\Projects\9076 RAMONA\9076.0126Aug2009.EC0 (Regular)
Identifier:	V239JE7M MC56-L5 [MC55] (c)Microcom 19Oct04
Algorithm:	Factory default
Data type:	Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time:	**0:00 Tuesday, August 25, 2009 => 0:00 Wednesday, August 26, 2009**
Included classes:	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Speed range:	5 - 100 mph.
Direction:	North (bound)
Separation:	All - (Headway)
Name:	TC Default Profile
Scheme:	Vehicle classification (Scheme F2)
Units:	Non metric (ft, mi, ft/s, mph, lb, ton)
In profile:	Vehicles = 1438 / 4107 (35.01%)

* **Tuesday, August 25, 2009 - Total=1438, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300
7	1	1	4	22	56	99	125	123	95	79	96	84	64	91	86	96	84	81	56	37	24	15	12
5	0	0	0	4	10	19	**35**	34	21	21	20	32	20	23	11	26	26	23	18	11	6	4	5
1	0	0	0	6	19	23	**37**	32	24	19	31	8	17	23	16	21	21	21	12	13	5	4	5
0	1	1	2	2	11	**27**	24	30	26	17	20	29	14	25	31	25	23	22	17	7	8	3	0
1	0	0	2	10	16	**30**	29	27	24	22	25	15	13	20	28	24	14	15	9	6	5	4	2

AM Peak 0630 - 0730 (129), AM PHF=0.87

MetroCount Traffic Executive
Vehicle Counts

VehicleCount-1696 -- English (ENU)

Datasets:

Site:	**[9077.01] MUSSEY GRADE RD (SOUTH OF HWY-67) SOUTHBOUND**
Direction:	7 - North bound A>B, South bound B>A., **Lane:** 0
Survey Duration:	19:55 Monday, August 24, 2009 => 11:15 Wednesday, August 26, 2009
File:	C:\Users\Gus\True Count\Projects\9076 RAMONA\9076.0126Aug2009.EC0 (Regular)
Identifier:	V239JE7M MC56-L5 [MC55] (c)Microcom 19Oct04
Algorithm:	Factory default
Data type:	Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time:	**0:00 Tuesday, August 25, 2009 => 0:00 Wednesday, August 26, 2009**
Included classes:	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Speed range:	5 - 100 mph.
Direction:	South (bound)
Separation:	All - (Headway)
Name:	TC Default Profile
Scheme:	Vehicle classification (Scheme F2)
Units:	Non metric (ft, mi, ft/s, mph, lb, ton)
In profile:	Vehicles = 1446 / 4107 (35.21%)

* **Tuesday, August 25, 2009 - Total=1446, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
6	4	3	4	2	5	34	43	61	53	70	76	64	76	108	124	140	153	128	95	79	64	35	19	
1	3	2	1	0	0	5	10	14	10	25	13	**15**	18	25	19	37	39	33	27	20	23	15	6	-
3	1	1	2	1	1	5	8	17	18	13	**16**	16	18	34	29	35	42	34	22	23	14	6	7	-
1	0	0	0	1	3	8	9	10	12	17	**22**	20	21	19	41	31	34	34	25	18	13	9	3	-
1	0	0	1	0	1	16	16	20	13	15	**25**	13	19	30	35	37	38	27	21	18	14	5	3	-

AM Peak 1115 - 1215 (78), AM PHF=0.78

MetroCount Traffic Executive
Vehicle Counts

VehicleCount-1698 -- English (ENU)

Datasets:

Site:	**[9076.02] MUSSEY GRADE RD (SOUTH OF DOS PICOS PARK RD) SOUTHBOUND**
Direction:	7 - North bound A>B, South bound B>A., **Lane:** 0
Survey Duration:	19:33 Monday, August 24, 2009 => 11:14 Wednesday, August 26, 2009
File:	C:\Users\Gus\True Count\Projects\9076 RAMONA\9076.0226Aug2009.EC0 (Regular)
Identifier:	W139N0DA MC56-L5 [MC55] (c)Microcom 19Oct04
Algorithm:	Factory default
Data type:	Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time:	**0:00 Tuesday, August 25, 2009 => 0:00 Wednesday, August 26, 2009**
Included classes:	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Speed range:	5 - 100 mph.
Direction:	South (bound)
Separation:	All - (Headway)
Name:	TC Default Profile
Scheme:	Vehicle classification (Scheme F2)
Units:	Non metric (ft, mi, ft/s, mph, lb, ton)
In profile:	Vehicles = 532 / 1550 (34.32%)

* **Tuesday, August 25, 2009 - Total=532, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
4	1	1	2	2	3	18	19	26	22	23	32	21	30	43	40	43	47	47	36	32	24	8	8	
2	1	0	1	1	0	2	6	5	6	7	**9**	7	3	12	10	16	11	13	12	6	7	2	1	-
1	0	1	0	0	0	4	2	8	6	6	**3**	1	13	14	11	11	14	10	7	12	3	3	1	-
1	0	0	0	1	3	3	4	4	2	7	**10**	7	9	8	11	9	6	12	12	9	7	3	5	-
0	0	0	1	0	0	9	7	9	8	3	**10**	6	5	9	8	7	16	12	5	5	7	0	1	-

AM Peak 1100 - 1200 (32), AM PHF=0.80

MetroCount Traffic Executive
Vehicle Counts

VehicleCount-1697 -- English (ENU)

Datasets:

Site:	**[9076.02] MUSSEY GRADE RD (SOUTH OF DOS PICOS PARK RD) NORTHBOUND**
Direction:	7 - North bound A>B, South bound B>A., **Lane:** 0
Survey Duration:	19:33 Monday, August 24, 2009 => 11:14 Wednesday, August 26, 2009
File:	C:\Users\Gus\True Count\Projects\9076 RAMONA\9076.0226Aug2009.EC0 (Regular)
Identifier:	W139N0DA MC56-L5 [MC55] (c)Microcom 19Oct04
Algorithm:	Factory default
Data type:	Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time:	**0:00 Tuesday, August 25, 2009 => 0:00 Wednesday, August 26, 2009**
Included classes:	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Speed range:	5 - 100 mph.
Direction:	North (bound)
Separation:	All - (Headway)
Name:	TC Default Profile
Scheme:	Vehicle classification (Scheme F2)
Units:	Non metric (ft, mi, ft/s, mph, lb, ton)
In profile:	Vehicles = 532 / 1550 (34.32%)

*** Tuesday, August 25, 2009 - Total=532, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
6	0	1	2	12	17	39	45	52	26	24	38	37	31	27	45	29	24	25	26	12	7	2	5	
4	0	0	0	4	4	8	11	**10**	5	5	7	11	11	3	5	6	9	11	11	6	5	1	1	-
1	0	0	0	1	4	8	17	**19**	8	7	12	4	10	6	9	5	6	5	5	1	2	1	3	-
0	0	1	1	1	5	10	6	7	6	6	8	15	4	8	21	9	7	4	7	2	0	0	0	-
1	0	0	1	6	4	13	11	**16**	7	6	11	7	6	10	10	9	2	5	3	3	0	0	1	-

AM Peak 0800 - 0900 (52), AM PHF=0.68

Traffic and Vehicle Data Systems Unit

2008 All Traffic Volumes on CSHS

Route 60 - 70 View

[Files]

The files containing traffic volumes (also known as counts) on California state highways are available for downloading. These files can be imported into spreadsheets or data bases for viewing and analysis.

[Route Number]

All California state highways are listed in this booklet in order of Legislative Route number.

[Annual Average Daily Traffic (Annual ADT)]

Annual average daily traffic is the total volume for the year divided by 365 days. The traffic count year is from October 1st through September 30th. Very few locations in California are actually counted continuously. Traffic Counting is generally performed by electronic counting instruments moved from location throughout the State in a program of continuous traffic count sampling. The resulting counts are adjusted to an estimate of annual average daily traffic by compensating for seasonal influence, weekly variation and other variables which may be present. Annual ADT is necessary for presenting a statewide picture of traffic flow, evaluating traffic trends, computing accident rates. planning and designing highways and other purposes.

[Peak Hour]

Included is an estimate of the "peak hour" traffic at all points on the state highway system. This value is useful to traffic engineers in estimating the amount of congestion experienced, and shows how near to capacity the highway is operating. Unless otherwise indicated, peak hour values indicate the volume in both directions.

A few hours each year are higher than the "peak hour", but not many. In urban and suburban areas, the peak hour normally occurs every weekday, and 200 or more hours will all be about the same. On roads with large seasonal fluctuations in traffic, the peak hour is the four near the maximum for the year but excluding a few (30 to 50 hours) that are exceedingly high and are not typical of the frequency of the high hours occurring during the season.

[Traffic Profile]

These files list 2008 taffic volumes for all count locations on the California state highway system. Peak hours, peak month ADTs and annual ADTs are shown at each count location. Significant volume changes (breakpoints)in the traffic profile along each route are counted and identified by name and milepost value. In addition to the profile breakpoints, these files list county lines and well-known landmarks to aid in orientation. All traffic volume figures listed include traffic in both directions unless otherwise indicated.

[Milepost]

Each profile breakpoint is identified by the milepost value corresponding to that point on the highway. The milepost values increase from the beginning of a route within a count to the next county line. The milepost values start over again at each county line. Milepost values usually increase from south to north or west to east depending upon the **general direction** the route follows within the state.

The milepost at a given location will remain the same year after year. When a section of road is relocated, new milepost (usually noted by an alphabetical prefix such as "R" or "M") are established for it. If relocation results in a change in length, "milepost equations" are introduced at the end of each relocated portion so that mileposts on the reminder of the route within the county will remain unchanged.

[Peak Month ADT]

The peak month ADT is the average daily traffic for the month of heaviest traffic flow. This data is obtained because on many routes, high traffic volumes which occur during a certain season of the year are more representative of traffic conditions than the annual ADT.

[Back and Ahead]

Back AADT, Peak Month, and Peak Hour usually represents traffic South or West of the count location. Ahead AADT, Peak Month, and Peak Hour usually represents traffic North or East of the count location. A listing of **routes with their designated direction of travel** is listed here.

District	Route	Rte Suf	County	PM Prefix	Postmile	Description	Back Peak Hour	Back Peak Month	Back AADT	Ahead Peak Hour	Ahead Peak Month	Ahead
11	67		SD		15.200	POWAY ROAD	2100	26500	23000	2200	26000	25000
11	67		SD	R	20.873	SAN VICENTE LAKE ROAD (MUSSEY GRADE ROAD)	2200	26000	25000	2150	25000	24500
11	67		SD		21.348	HIGHLAND VALLEY ROAD	2150	25000	24500	2550	29500	29000

APPENDIX B

INTERSECTION METHODOLOGY AND ANALYSIS SHEETS

2000 HIGHWAY CAPACITY MANUAL LEVEL OF SERVICE CRITERIA FOR SIGNALIZED INTERSECTIONS

In the 2000 Highway Capacity Manual (HCM), Level of Service for signalized intersections is defined in terms of delay. Delay is a measure of driver discomfort, frustration, fuel consumption, and lost travel time. Specifically, Level of Service criteria are stated in terms of the average control delay per vehicle for a 15-minute analysis period. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay.

Delay is a complex measure, and is dependent on a number of variables, including the quality of progression, the cycle length, the green ratio, and the v/c ratio for the lane group or approach in question.

LEVEL OF SERVICE	CONTROLLED DELAY PER VEHICLE (SEC)		
A		≤	10.0
B	10.1	to	20.0
C	20.1	to	35.0
D	35.1	to	55.0
E	55.1	to	80.0
F		>	80.0

Level of Service A describes operations with very low delay, (i.e. less than 10.0 seconds per vehicle). This occurs when progression is extremely favorable, and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.

Level of Service B describes operations with delay in the range of 10.1 to 20.0 seconds per vehicle. This generally occurs with good progression and/or short cycle lengths. More vehicles stop than for LOS A, causing higher levels of average delay.

Level of Service C describes operations with delay in the range of 20.1 to 35.0 seconds per vehicle. These higher delays may result from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear in the level. The number of vehicles stopping is significant at this level, although many still pass through the intersections without stopping.

Level of Service D describes operations with delay in the range of 35.1 to 55.0 seconds per vehicle. At Level D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high v/c ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.

Level of Service E describes operations with delay in the range of 55.1 to 80.0 seconds per vehicle. This is considered to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths, and high v/c ratios. Individual cycle failures are frequent occurrences.

Level of Service F describes operations with delay in excess of 80.0 seconds per vehicle. This is considered to be unacceptable to most drivers. This condition often occurs with over-saturation (i.e. when arrival flow rates exceed the capacity of the intersection). It may also occur at high v/c ratios below 1.00 with many individual cycle failures. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.

2000 HIGHWAY CAPACITY MANUAL LEVEL OF SERVICE CRITERIA FOR SIGNALIZED INTERSECTIONS

In the 2000 Highway Capacity Manual (HCM), Level of Service for signalized intersections is defined in terms of delay. Delay is a measure of driver discomfort, frustration, fuel consumption, and lost travel time. Specifically, Level of Service criteria are stated in terms of the average control delay per vehicle for a 15-minute analysis period. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay.

Delay is a complex measure, and is dependent on a number of variables, including the quality of progression, the cycle length, the green ratio, and the v/c ratio for the lane group or approach in question.

LEVEL OF SERVICE	CONTROLLED DELAY PER VEHICLE (SEC)		
A		≤	10.0
B	10.1	to	20.0
C	20.1	to	35.0
D	35.1	to	55.0
E	55.1	to	80.0
F		>	80.0

Level of Service A describes operations with very low delay, (i.e. less than 10.0 seconds per vehicle). This occurs when progression is extremely favorable, and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.

Level of Service B describes operations with delay in the range of 10.1 to 20.0 seconds per vehicle. This generally occurs with good progression and/or short cycle lengths. More vehicles stop than for LOS A, causing higher levels of average delay.

Level of Service C describes operations with delay in the range of 20.1 to 35.0 seconds per vehicle. These higher delays may result from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear in the level. The number of vehicles stopping is significant at this level, although many still pass through the intersections without stopping.

Level of Service D describes operations with delay in the range of 35.1 to 55.0 seconds per vehicle. At Level D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high v/c ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.

Level of Service E describes operations with delay in the range of 55.1 to 80.0 seconds per vehicle. This is considered to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths, and high v/c ratios. Individual cycle failures are frequent occurrences.

Level of Service F describes operations with delay in excess of 80.0 seconds per vehicle. This is considered to be unacceptable to most drivers. This condition often occurs with over-saturation (i.e. when arrival flow rates exceed the capacity of the intersection). It may also occur at high v/c ratios below 1.00 with many individual cycle failures. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	9	461	42	16	907	67	408	20	27	70	8	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.94	1.00	1.00	0.94	1.00	0.97		1.00	0.98	
Flpb, ped/bikes	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.91		1.00	0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1754	1863	1495	1770	1863	1495	1770	1650		1770	1698	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1754	1863	1495	1770	1863	1495	1770	1650		1770	1698	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	10	501	46	17	986	73	443	22	29	76	9	7
RTOR Reduction (vph)	0	0	24	0	0	28	0	22	0	0	6	0
Lane Group Flow (vph)	10	501	22	17	986	45	443	29	0	76	10	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6						
Actuated Green, G (s)	0.8	55.8	55.8	2.0	57.0	57.0	27.0	27.0		16.0	16.0	
Effective Green, g (s)	0.8	55.8	55.8	2.0	57.0	57.0	27.0	27.0		16.0	16.0	
Actuated g/C Ratio	0.01	0.48	0.48	0.02	0.49	0.49	0.23	0.23		0.14	0.14	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	12	890	714	30	909	730	409	381		242	233	
v/s Ratio Prot	0.01	0.27		c0.01	c0.53		c0.25	c0.02		0.04	0.01	
v/s Ratio Perm			0.01			0.03						
v/c Ratio	0.83	0.56	0.03	0.57	1.08	0.06	1.08	0.08		0.31	0.04	
Uniform Delay, d1	57.9	21.8	16.2	57.0	29.9	15.8	44.9	35.1		45.5	43.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	168.3	0.8	0.0	22.3	55.5	0.0	68.7	0.4		3.4	0.3	
Delay (s)	226.2	22.6	16.2	79.2	85.4	15.8	113.6	35.5		48.8	44.1	
Level of Service	F	C	B	E	F	B	F	D		D	D	
Approach Delay (s)		25.7			80.6			105.5			48.0	
Approach LOS		C			F			F			D	

Intersection Summary				
HCM Average Control Delay	71.0	HCM Level of Service		E
HCM Volume to Capacity ratio	0.86			
Actuated Cycle Length (s)	116.8	Sum of lost time (s)		8.0
Intersection Capacity Utilization	83.7%	ICU Level of Service		E
Analysis Period (min)	15			
c Critical Lane Group				

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	350	15	34	1351	63	70
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	380	16	37	1468	68	76
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)				822		
pX, platoon unblocked					0.52	
vC, conflicting volume			397		1923	380
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			397		2312	380
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			97		0	89
cM capacity (veh/h)			1162		21	667

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	380	16	37	1468	145
Volume Left	0	0	37	0	68
Volume Right	0	16	0	0	76
cSH	1700	1700	1162	1700	43
Volume to Capacity	0.22	0.01	0.03	0.86	3.36
Queue Length 95th (ft)	0	0	2	0	Err
Control Delay (s)	0.0	0.0	8.2	0.0	Err
Lane LOS			A		F
Approach Delay (s)	0.0		0.2		Err
Approach LOS					F

Intersection Summary				
Average Delay	706.4			
Intersection Capacity Utilization	85.6%	ICU Level of Service		E
Analysis Period (min)	15			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	45	322	1427	26	21	147
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	49	350	1551	28	23	160
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						7
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1579				1824	1551
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1579				1824	1551
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	88				62	0
cM capacity (veh/h)	413				60	103

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	49	175	175	1551	28	183
Volume Left	49	0	0	0	0	23
Volume Right	0	0	0	0	28	160
cSH	413	1700	1700	1700	1700	117
Volume to Capacity	0.12	0.10	0.10	0.91	0.02	1.56
Queue Length 95th (ft)	10	0	0	0	0	333
Control Delay (s)	14.9	0.0	0.0	0.0	0.0	333.2
Lane LOS	B					F
Approach Delay (s)	1.8			0.0		333.2
Approach LOS						F

Intersection Summary			
Average Delay	28.5		
Intersection Capacity Utilization	90.9%	ICU Level of Service	E
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	6	874	307	44	542	57	88	13	31	178	55	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.93	1.00	1.00	0.93	1.00	0.95		1.00	0.99	
Flpb, ped/bikes	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.89		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1734	1863	1477	1770	1863	1477	1770	1586		1770	1774	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1734	1863	1477	1770	1863	1477	1770	1586		1770	1774	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	7	950	334	48	589	62	96	14	34	193	60	17
RTOR Reduction (vph)	0	0	147	0	0	25	0	30	0	0	6	0
Lane Group Flow (vph)	7	950	187	48	589	37	96	18	0	193	71	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6						
Actuated Green, G (s)	0.7	86.1	86.1	6.0	91.4	91.4	17.7	16.7		29.1	28.1	
Effective Green, g (s)	0.7	86.1	86.1	6.0	91.4	91.4	17.7	16.7		29.1	28.1	
Actuated g/C Ratio	0.00	0.56	0.56	0.04	0.59	0.59	0.12	0.11		0.19	0.18	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	8	1042	826	69	1106	877	204	172		335	324	
v/s Ratio Prot	0.00	c0.51		c0.03	0.32		0.05	0.01		c0.11	c0.04	
v/s Ratio Perm			0.13			0.02						
v/c Ratio	0.88	0.91	0.23	0.70	0.53	0.04	0.47	0.10		0.58	0.22	
Uniform Delay, d1	76.6	30.5	17.1	73.0	18.6	13.0	63.7	61.8		56.8	53.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	238.3	11.8	0.1	26.2	0.5	0.0	7.6	1.2		7.0	1.6	
Delay (s)	314.8	42.3	17.2	99.3	19.1	13.0	71.3	63.0		63.8	55.1	
Level of Service	F	D	B	F	B	B	E	E		E	E	
Approach Delay (s)		37.3			24.0			68.6			61.3	
Approach LOS		D			C			E			E	

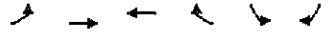
Intersection Summary				
HCM Average Control Delay	38.0	HCM Level of Service		D
HCM Volume to Capacity ratio	0.73			
Actuated Cycle Length (s)	153.9	Sum of lost time (s)		12.0
Intersection Capacity Utilization	69.2%	ICU Level of Service		C
Analysis Period (min)	15			

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	1260	70	99	518	28	66
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1370	76	108	563	30	72
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)				822		
pX, platoon unblocked					0.79	
vC, conflicting volume			1446		2148	1370
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1446		2316	1370
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			77		0	60
cM capacity (veh/h)			469		25	179

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	1370	76	108	563	102
Volume Left	0	0	108	0	30
Volume Right	0	76	0	0	72
cSH	1700	1700	469	1700	64
Volume to Capacity	0.81	0.04	0.23	0.33	1.60
Queue Length 95th (ft)	0	0	22	0	226
Control Delay (s)	0.0	0.0	15.0	0.0	437.6
Lane LOS			B		F
Approach Delay (s)	0.0		2.4		437.6
Approach LOS					F

Intersection Summary			
Average Delay	20.9		
Intersection Capacity Utilization	87.4%	ICU Level of Service	E
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	201	1402	505	34	7	66
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	218	1524	549	37	8	72
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						7
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	586				1748	549
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	586				1748	549
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	78				87	85
cM capacity (veh/h)	985				60	480

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	218	762	762	549	37	79
Volume Left	218	0	0	0	0	8
Volume Right	0	0	0	0	37	72
cSH	985	1700	1700	1700	1700	530
Volume to Capacity	0.22	0.45	0.45	0.32	0.02	0.15
Queue Length 95th (ft)	21	0	0	0	0	13
Control Delay (s)	9.7	0.0	0.0	0.0	0.0	19.5
Lane LOS	A					C
Approach Delay (s)	1.2			0.0		19.5
Approach LOS						C

Intersection Summary				
Average Delay	1.5			
Intersection Capacity Utilization	51.0%	ICU Level of Service		A
Analysis Period (min)	15			

1: SR 67 & Dye Road — Existing + Project AM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	472	37	16	921	86	363	32	19	60	7	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.94	1.00	1.00	0.94	1.00	0.98		1.00	0.98	
Flpb, ped/bikes	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.94		1.00	0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1754	1863	1495	1770	1863	1495	1770	1721		1770	1737	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1754	1863	1495	1770	1863	1495	1770	1721		1770	1737	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	5	513	40	17	1001	93	395	35	21	65	8	4
RTOR Reduction (vph)	0	0	21	0	0	35	0	16	0	0	3	0
Lane Group Flow (vph)	5	513	19	17	1001	58	395	40	0	65	9	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6						
Actuated Green, G (s)	0.8	55.8	55.8	2.0	57.0	57.0	24.0	26.0		17.0	19.0	
Effective Green, g (s)	0.8	55.8	55.8	2.0	57.0	57.0	24.0	26.0		17.0	19.0	
Actuated g/C Ratio	0.01	0.48	0.48	0.02	0.49	0.49	0.21	0.22		0.15	0.16	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	12	890	714	30	909	730	364	383		258	283	
v/s Ratio Prot	0.00	0.28		c0.01	c0.54		c0.22	c0.02		0.04	0.00	
v/s Ratio Perm			0.01			0.04						
v/c Ratio	0.42	0.58	0.03	0.57	1.10	0.08	1.09	0.10		0.25	0.03	
Uniform Delay, d1	57.8	22.0	16.1	57.0	29.9	15.9	46.4	36.1		44.3	41.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	21.8	0.9	0.0	22.3	61.5	0.0	71.9	0.5		2.3	0.2	
Delay (s)	79.5	22.9	16.2	79.2	91.4	16.0	118.3	36.7		46.6	41.4	
Level of Service	E	C	B	E	F	B	F	D		D	D	
Approach Delay (s)		22.9			84.9			108.2			45.8	
Approach LOS		C			F			F			D	

Intersection Summary				
HCM Average Control Delay	72.6	HCM Level of Service		E
HCM Volume to Capacity ratio	0.85			
Actuated Cycle Length (s)	116.8	Sum of lost time (s)		8.0
Intersection Capacity Utilization	81.9%	ICU Level of Service		D
Analysis Period (min)	15			
c Critical Lane Group				

24: SR 67 & Mussey Grade Road — Existing + Project AM

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	350	16	44	1351	63	71
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	380	17	48	1468	68	77
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)				822		
pX, platoon unblocked					0.52	
vC, conflicting volume			398		1945	380
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			398		2353	380
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			96		0	88
cM capacity (veh/h)			1161		20	667

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	380	17	48	1468	146
Volume Left	0	0	48	0	68
Volume Right	0	17	0	0	77
cSH	1700	1700	1161	1700	40
Volume to Capacity	0.22	0.01	0.04	0.86	3.60
Queue Length 95th (ft)	0	0	3	0	Err
Control Delay (s)	0.0	0.0	8.2	0.0	Err
Lane LOS			A		F
Approach Delay (s)	0.0		0.3		Err
Approach LOS					F

Intersection Summary				
Average Delay	707.2			
Intersection Capacity Utilization	85.6%	ICU Level of Service		E
Analysis Period (min)	15			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	45	323	1427	26	21	147
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	49	351	1551	28	23	160
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						7
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1579				1824	1551
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1579				1824	1551
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	88				62	0
cM capacity (veh/h)	413				60	103

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	49	176	176	1551	28	183
Volume Left	49	0	0	0	0	23
Volume Right	0	0	0	0	28	160
cSH	413	1700	1700	1700	1700	117
Volume to Capacity	0.12	0.10	0.10	0.91	0.02	1.56
Queue Length 95th (ft)	10	0	0	0	0	333
Control Delay (s)	14.9	0.0	0.0	0.0	0.0	333.2
Lane LOS	B					F
Approach Delay (s)	1.8			0.0		333.2
Approach LOS						F

Intersection Summary			
Average Delay	28.5		
Intersection Capacity Utilization	90.9%	ICU Level of Service	E
Analysis Period (min)	15		

1: SR 67 & Dye Road

Existing + Project PM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	2	994	284	37	554	64	84	9	47	139	89	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.93	1.00	1.00	0.93	1.00	0.94		1.00	0.99	
Flpb, ped/bikes	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.87		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1731	1863	1469	1770	1863	1469	1770	1530		1770	1817	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1731	1863	1469	1770	1863	1469	1770	1530		1770	1817	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	1080	309	40	602	70	91	10	51	151	97	12
RTOR Reduction (vph)	0	0	110	0	0	25	0	46	0	0	3	0
Lane Group Flow (vph)	2	1080	199	40	602	45	91	15	0	151	106	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6						
Actuated Green, G (s)	0.7	106.7	106.7	5.2	111.2	111.2	20.6	16.5		26.8	22.7	
Effective Green, g (s)	0.7	106.7	106.7	5.2	111.2	111.2	20.6	16.5		26.8	22.7	
Actuated g/C Ratio	0.00	0.62	0.62	0.03	0.65	0.65	0.12	0.10		0.16	0.13	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	7	1161	916	54	1210	954	213	147		277	241	
v/s Ratio Prot	0.00	c0.58		c0.02	0.32		0.05	0.01		c0.09	c0.06	
v/s Ratio Perm			0.14			0.03						
v/c Ratio	0.29	0.93	0.22	0.74	0.50	0.05	0.43	0.10		0.55	0.44	
Uniform Delay, d1	85.0	28.9	14.0	82.3	15.5	10.8	69.8	70.6		66.6	68.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	21.2	13.0	0.1	41.8	0.3	0.0	6.2	1.4		7.5	5.8	
Delay (s)	106.2	41.9	14.2	124.1	15.9	10.9	76.0	72.0		74.1	74.2	
Level of Service	F	D	B	F	B	B	E	E		E	E	
Approach Delay (s)		35.8			21.4			74.4			74.1	
Approach LOS		D			C			E			E	

Intersection Summary				
HCM Average Control Delay	38.0	HCM Level of Service	D	
HCM Volume to Capacity ratio	0.79			
Actuated Cycle Length (s)	171.2	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	73.3%	ICU Level of Service	D	
Analysis Period (min)	15			

c Critical Lane Group

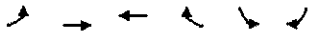
24: SR 67 & Mussey Grade Road

Existing + Project PM

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	1260	88	102	518	28	67
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1370	96	111	563	30	73
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)				822		
pX, platoon unblocked					0.85	
vC, conflicting volume			1465		2154	1370
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1465		2267	1370
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			76		0	59
cM capacity (veh/h)			461		29	179

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	1370	96	111	563	103
Volume Left	0	0	111	0	30
Volume Right	0	96	0	0	73
cSH	1700	1700	461	1700	71
Volume to Capacity	0.81	0.06	0.24	0.33	1.46
Queue Length 95th (ft)	0	0	23	0	214
Control Delay (s)	0.0	0.0	15.3	0.0	369.4
Lane LOS			C		F
Approach Delay (s)	0.0		2.5		369.4
Approach LOS					F

Intersection Summary				
Average Delay	17.8			
Intersection Capacity Utilization	87.6%	ICU Level of Service	E	
Analysis Period (min)	15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑	↱	↰	↱
Volume (veh/h)	201	1420	505	34	7	66
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	218	1543	549	37	8	72
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						7
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	586				1758	549
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	586				1758	549
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	78				87	85
cM capacity (veh/h)	985				59	480

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	218	772	772	549	37	79
Volume Left	218	0	0	0	0	8
Volume Right	0	0	0	0	37	72
cSH	985	1700	1700	1700	1700	530
Volume to Capacity	0.22	0.45	0.45	0.32	0.02	0.15
Queue Length 95th (ft)	21	0	0	0	0	13
Control Delay (s)	9.7	0.0	0.0	0.0	0.0	19.7
Lane LOS	A					C
Approach Delay (s)	1.2			0.0		19.7
Approach LOS						C

Intersection Summary				
Average Delay	1.5			
Intersection Capacity Utilization	51.0%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	7	653	92	50	1395	185	485	60	35	130	17	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.94	1.00	1.00	0.94	1.00	0.98		1.00	0.97	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.94		1.00	0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1762	1863	1494	1770	1863	1494	1770	1723		1770	1691	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1762	1863	1494	1770	1863	1494	1770	1723		1770	1691	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	8	710	100	54	1516	201	527	65	38	141	18	15
RTOR Reduction (vph)	0	0	53	0	0	49	0	18	0	0	13	0
Lane Group Flow (vph)	8	710	47	54	1516	152	527	85	0	141	20	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6						
Actuated Green, G (s)	0.8	55.4	55.4	4.0	58.6	58.6	27.0	27.0		16.0	16.0	
Effective Green, g (s)	0.8	55.4	55.4	4.0	58.6	58.6	27.0	27.0		16.0	16.0	
Actuated g/C Ratio	0.01	0.47	0.47	0.03	0.49	0.49	0.23	0.23		0.14	0.14	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	12	872	699	60	922	739	404	393		239	229	
v/s Ratio Prot	0.00	0.38		c0.03	c0.81		c0.30	c0.05		0.08	0.01	
v/s Ratio Perm			0.03			0.10						
v/c Ratio	0.67	0.81	0.07	0.90	1.64	0.21	1.30	0.22		0.59	0.09	
Uniform Delay, d1	58.7	27.1	17.3	57.0	29.9	16.8	45.7	37.1		48.1	44.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	89.5	5.9	0.0	81.0	294.8	0.1	154.0	1.3		10.3	0.8	
Delay (s)	148.1	33.0	17.3	138.0	324.7	16.9	199.7	38.4		58.4	45.6	
Level of Service	F	C	B	F	F	B	F	D		E	D	
Approach Delay (s)		32.2			284.1			173.3			56.0	
Approach LOS		C			F			F			E	

Intersection Summary				
HCM Average Control Delay	191.1	HCM Level of Service	F	
HCM Volume to Capacity ratio	1.29			
Actuated Cycle Length (s)	118.4	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	113.6%	ICU Level of Service	H	
Analysis Period (min)	15			

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	588	26	54	1950	73	81
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	639	28	59	2120	79	88
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)				822		
pX, platoon unblocked					0.51	
vC, conflicting volume			667		2876	639
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			667		4177	639
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			94		0	81
cM capacity (veh/h)			922		1	476

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	639	28	59	2120	167
Volume Left	0	0	59	0	79
Volume Right	0	28	0	0	88
cSH	1700	1700	922	1700	3
Volume to Capacity	0.38	0.02	0.06	1.25	66.91
Queue Length 95th (ft)	0	0	5	0	Err
Control Delay (s)	0.0	0.0	9.2	0.0	Err
Lane LOS			A		F
Approach Delay (s)	0.0		0.2		Err
Approach LOS					F

Intersection Summary			
Average Delay	555.7		
Intersection Capacity Utilization	118.3%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	148	518	2050	76	35	208
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	161	563	2228	83	38	226
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						7
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2311				2832	2228
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2311				2832	2228
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	25				0	0
cM capacity (veh/h)	213				3	35

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	161	282	282	2228	83	264
Volume Left	161	0	0	0	0	38
Volume Right	0	0	0	0	83	226
cSH	213	1700	1700	1700	1700	16
Volume to Capacity	0.75	0.17	0.17	1.31	0.05	16.63
Queue Length 95th (ft)	129	0	0	0	0	Err
Control Delay (s)	60.3	0.0	0.0	0.0	0.0	Err
Lane LOS	F					F
Approach Delay (s)	13.4			0.0		Err
Approach LOS						F

Intersection Summary			
Average Delay	803.5		
Intersection Capacity Utilization	129.4%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	7	1292	449	93	808	101	101	17	67	179	129	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.92	1.00	1.00	0.92	1.00	0.94		1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.88		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	1463	1770	1863	1463	1770	1539		1770	1804	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1863	1463	1770	1863	1463	1770	1539		1770	1804	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	8	1404	488	101	878	110	110	18	73	195	140	23
RTOR Reduction (vph)	0	0	125	0	0	31	0	67	0	0	4	0
Lane Group Flow (vph)	8	1404	363	101	878	79	110	24	0	195	159	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6						
Actuated Green, G (s)	1.6	124.4	124.4	9.0	131.8	131.8	16.0	16.0		17.0	17.0	
Effective Green, g (s)	1.6	124.4	124.4	9.0	131.8	131.8	16.0	16.0		17.0	17.0	
Actuated g/C Ratio	0.01	0.68	0.68	0.05	0.72	0.72	0.09	0.09		0.09	0.09	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	16	1271	998	87	1346	1057	155	135		165	168	
v/s Ratio Prot	0.00	c0.75		c0.06	0.47		0.06	0.02		c0.11	c0.09	
v/s Ratio Perm			0.25			0.05						
v/c Ratio	0.50	1.10	0.36	1.16	0.65	0.08	0.71	0.18		1.18	0.95	
Uniform Delay, d1	90.0	29.0	12.3	86.7	13.3	7.4	80.9	77.1		82.7	82.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	22.5	59.0	0.2	146.3	1.1	0.0	24.0	2.9		127.4	57.1	
Delay (s)	112.5	88.0	12.5	233.0	14.4	7.5	104.9	80.0		210.1	139.3	
Level of Service	F	F	B	F	B	A	F	F		F	F	
Approach Delay (s)		68.7			34.0			93.7			177.9	
Approach LOS		E			C			F			F	

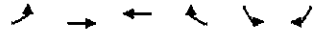
Intersection Summary				
HCM Average Control Delay	70.5	HCM Level of Service	E	
HCM Volume to Capacity ratio	1.08			
Actuated Cycle Length (s)	182.4	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	109.7%	ICU Level of Service	H	
Analysis Period (min)	15			

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	1729	101	107	793	33	72
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1879	110	116	862	36	78
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)				822		
pX, platoon unblocked					0.74	
vC, conflicting volume			1989		2974	1879
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1989		3480	1879
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			60		0	12
cM capacity (veh/h)			289		3	89

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	1879	110	116	862	114
Volume Left	0	0	116	0	36
Volume Right	0	110	0	0	78
cSH	1700	1700	289	1700	10
Volume to Capacity	1.11	0.06	0.40	0.51	11.98
Queue Length 95th (ft)	0	0	46	0	Err
Control Delay (s)	0.0	0.0	25.6	0.0	Err
Lane LOS			D		F
Approach Delay (s)	0.0		3.0		Err
Approach LOS					F

Intersection Summary			
Average Delay	371.3		
Intersection Capacity Utilization	103.9%	ICU Level of Service	G
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	460	2021	754	76	30	91
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	500	2197	820	83	33	99
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						7
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	902				2918	820
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	902				2918	820
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	33				0	69
cM capacity (veh/h)	749				4	318

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	500	1098	1098	820	83	132
Volume Left	500	0	0	0	0	33
Volume Right	0	0	0	0	83	99
cSH	749	1700	1700	1700	1700	16
Volume to Capacity	0.67	0.65	0.65	0.48	0.05	8.36
Queue Length 95th (ft)	129	0	0	0	0	Err
Control Delay (s)	18.9	0.0	0.0	0.0	0.0	Err
Lane LOS	C					F
Approach Delay (s)	3.5			0.0		Err
Approach LOS						F

Intersection Summary			
Average Delay	355.1		
Intersection Capacity Utilization	78.5%	ICU Level of Service	D
Analysis Period (min)	15		

APPENDIX C

COUNTY OF SAN DIEGO ROADWAY CLASSIFICATION TABLE

County of San Diego
DRAFT

August 11, 1998

TABLE 1

AVERAGE DAILY VEHICLE TRIPS

CIRCULATION ELEMENT ROADS		LEVEL OF SERVICE				
CLASS	**X-SECTION**	**A**	**B**	**C**	**D**	**E**
Expressway	126/146	<36,000	<54,000	<70,000	<86,000	<108,000
Prime Arterial	102/122	<22,200	<37,000	<44,600	<50,000	<57,000
Major Road	78/98	<14,800	<24,700	<29,600	<33,400	<37,000
Collector	64/84	<13,700	<22,800	<27,400	<30,800	<34,200
Town Collector	54/74	<3,000	<6,000	<9,500	<13,500	<19,000
Light Collector	40/60	<1,900	<4,100	<7,100	<10,900	<16,200
Rural Collector	40/84	<1,900	<4,100	<7,100	<10,900	<16,200
Rural Light Collector	40/60	<1,900	<4,100	<7,100	<10,900	<16,200
Recreational Parkway	40/100	<1,900	<4,100	<7,100	<10,900	<16,200
Rural Mountain	40/100	<1,900	<4,100	<7,100	<10,900	<16,200

NON-CIRCULATION ELEMENT ROADS		LEVEL OF SERVICE				
CLASS	**X-SECTION**	**A**	**B**	**C**	**D**	**E**
Residential Collector	40/60	*	*	<4,500	*	*
Residential Road	36/56	*	*	<1,500	*	*
Residential Cul-de-sac or Loop Road	32/52	*	*	< 200	*	*

* Levels of service are not applicable to residential streets since their primary purpose is to serve abutting lots, not carry through traffic. Levels of service normally apply to roads carrying through traffic between major trip generators and attractors.

APPENDIX D

CORNER SIGHT DISTANCE CERTIFICATION

NASLAND ENGINEERING

CIVIL ENGINEERING • SURVEYING • PLANNING

October 28, 2009
Job No. 196-222.2

County of San Diego
Department of Public Works
5201 Ruffin Road
Suite D
San Diego, CA 92123

Project No.: MUP 70-379W2 Stormwater Management Plan

Project Name: Salvation Army Divisional Camp & Retreat, Ramona, CA

Sight Distance Certification

I hereby certify that a minimum unobstructed sight distance of 500 feet in both directions exists from the Salvation Army Divisional Camp entrance along Mussey Grade Road per the design standards of 6.1E of the County of San Diego Public Road Standards. If required, a clear space easement shall be dedicated to the County to maintain this unobstructed site distance.

Sincerely,
NASLAND ENGINEERING

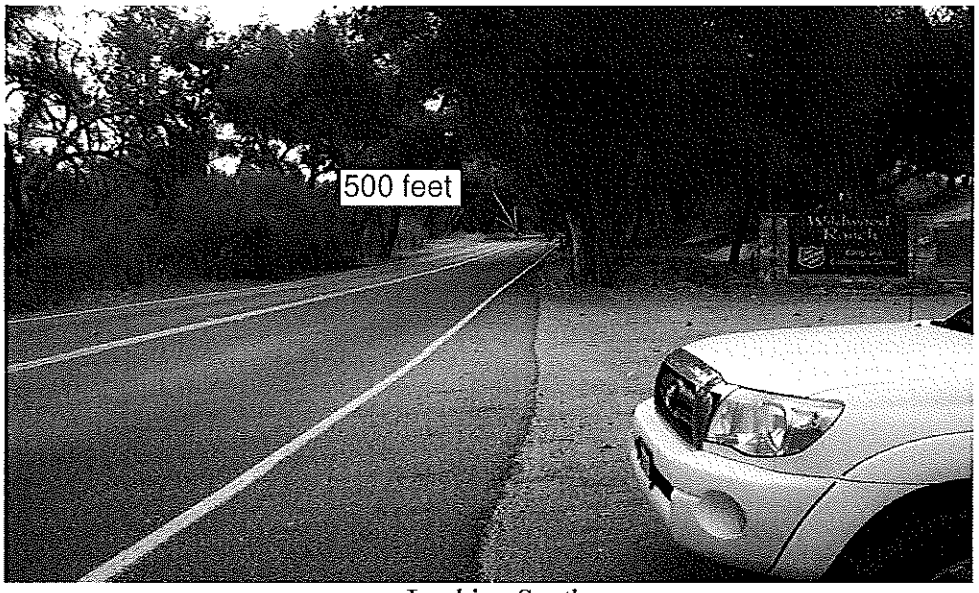
Lawrence P Thornburgh, PE, PLS
RCE 49795
Sr. Project Manager

Attachment: Photo looking south and north

REGISTERED PROFESSIONAL ENGINEER
LAWRENCE PAUL THORNBURGH
No. 49795
Exp. 6-30-10
CIVIL
STATE OF CALIFORNIA

1740 Ruffner Street, San Diego, California 92111 • 858-292-7770 • FAX 858-571-4241

Looking North



Looking South